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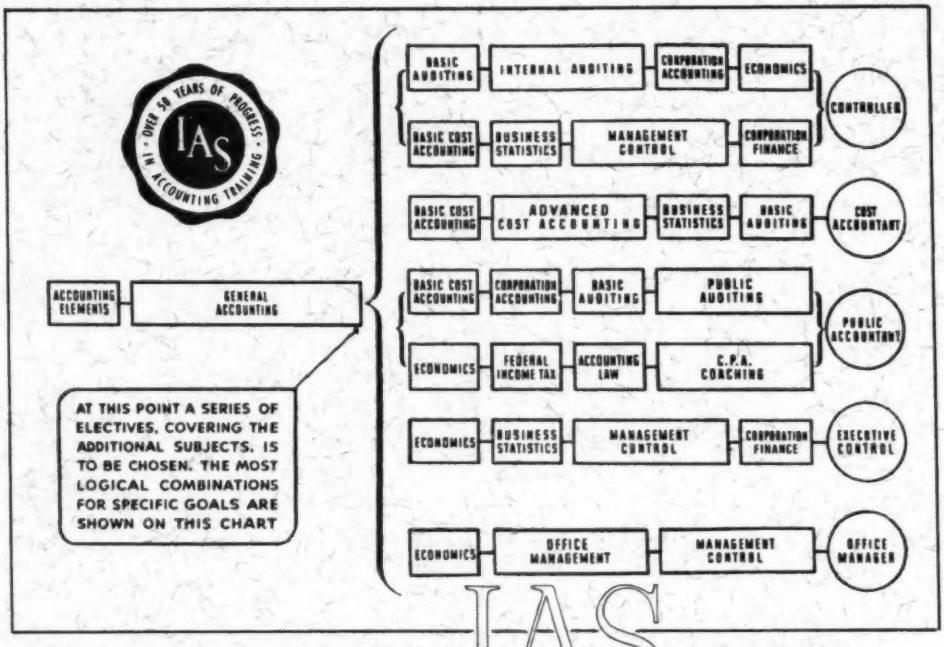

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A SALUTE TO

VICE ADMIRAL EDWARD W. CLEXTON, USN

CHIEF OF NAVAL MATERIEL

Admiral Clexton, we understand you will retire from active Naval duty on 30 June 1960, after forty years of distinguished service.

As President of the American Society of Military Comptrollers for the two-year period just preceding General Lawton, and through your leadership and efforts the American Society of Military Comptrollers experienced the phenominal growth from four Chapters to twenty-one Chapters, many of them being overseas.

For services rendered to the Society you were awarded the Certificate of Outstanding Service to the Profession of Military Comptrollership.

We wish for you, Admiral Clexton, much happiness and contentment in your retirement and are sure that success will follow you in whatever line of business, if any, you choose to pursue.

We hope you will have many opportunities to visit with us and our Chapters in the years to come. The doors will always be open wide.

LETTER TO THE EDITOR

Dear Sir:

Permit me to call to the attention of the Readers of the COMPTROLLER, who have indicated an interest in my article RUBRIC BUDGET/COST RATIOS, A New Navy Industrial Fund Concept, published in the September issue of last year, page 33 et seq., the article, A-D-P-S A CHALLENGE AND OPPORTUNITY, by Major General Robert W. Ward, Director of Management Services, Office of Comptroller of the Army, beginning on page 21 of the recent March issue. I quote one sentence, "Ever so often a new discussion area crops up which commands the attention of everyone in a particular field of endeavor, and it usually represents a significant step forward in methods or doctrine." I submit, Mr. Editor, that the Rubric Concept is a significant step forward in the Method and in the Doctrine of Financial Management.

The UNIVAC and Mr. Pacioli

Mr. York, for example in his letter to the Editor published in the March issue page 13 et seq., quotes my article to indicate that he sees significance in the rubrics. He agrees that they require only two things, (1) use of mechanical or electronic data processing capability; and (2) a budget/cost structure. This agreement pleases me. However, let me emphasize this: Something happened to the Accounting World when Eckart and Mauchley put together some wires and tubes in Philadelphia in 1951 and came up with the first UNIVAC. From that moment we Accountants have been confused.

Dr. Henry Rand Hatfield used to tell his classes at the University of California, "GO BACK" - not to Columbus but to his time, and "READ LUCAS PACIOLI!" He invented debits and credits in 1494 and developed the double-entry rationale of business bookkeeping used since his time. "Lucas has it all. Read him!" And, Dr. Hatfield would usually add in his own inimitable manner, "Nothing has been added since Pacioli."

Now, in view of UNIVAC and the developments in electronic data processing equipment since 1951 as General Ward presages in his fine article, a new concept is called for that can supplement the controls invented by Mr. Pacioli. A concept that can use the capability of this new equipment. A concept of cost control and program control that goes far beyond the post obitum summaries of Mr. York's business-type accounting. A concept of data balance and forward analysis is required that can give us dynamic tools since "We are operating in a fluid environment of exploding growth" (Ward, ibid, page 21). The rubric idea offers such a concept.

Years ago while a graduate student of Economics at the University of California, Dimnet's book "The Art of Thinking" was recommended reading. He says, for example, that we live in perpetual vagueness -- that in thinking on some important subject we generally are merely thinking of thinking about it. On the other hand, we can reason by analogy. If two things have common characteristics they act alike. I'll follow Dimnet's dictum here and take an analogy that has exploded some of the aspects of our mundane lives. Using this analogy I'll try to explain the rubric.

Split-Molecule of Surface Chemistry

Has your son ever asked the question, "Say, Pop, how does soap work? Why not just use water in the washing machine?" You can pass the question by saying "Ask Mother!" Or, you can tell your son something. For example, "The detergent action of soap is due to the structure of its split molecule." Then the question, "Yeah, Pop! But what is a split molecule?" Now the answer to this last question will set up the analogy I need to show how the rubric is cost controlling and program regulative. The rubric, like the soap molecule, is a two part thing.

How does soap work? How does the soap molecule clean fabrics when water alone cannot? How does this molecule along with the water succeed in keeping our garments clean and wholesome? The answers to these questions will show how the RUBRIC CAN CLEAN OUT HIGH COSTS AND INTEGRATE A PROGRAM, however financed or funded, into a sweet running operation to achieve at planned costs the accomplishment of missions and specific assignments. It can do this without the need of anybody getting offensive, for everybody does it together! If you think this is optimistic -- read what I have to say! Understand me! And, you will agree with me.

Detergent action is due to Surface Chemistry -- only recently recognized and now only partially understood (Lessing, "Understanding Chemistry"). But already important phenomena hitherto completely unexplainable have been explained. These include some of life's most vital processes.

The new powerful detergents now on the market have been developed through an understanding of Surface Chemistry. Also, many of the new wonder drugs. For an example, take common soap which has been made for centuries by the treatment of animal fats with soda ash. Its molecule is now known to be split into two parts. Its structure is like that of the oxidized oil slick formed when small particles of oil from an automobile drop onto puddles of water. The oil spreads out in an exceedingly thin skin, just one molecule thick! This "oil slick" presents a basic situation in surface chemistry. One end of this molecule is soluble. The other end is not. The soluble end seeks to immerse in the water. The other end will not immerse. Thus the molecules "stand on their heads" and range themselves in an exceedingly thin skin of oil about four billionths of an inch thick -- the thickness of one molecule. The various degrees of oxidation give this film its refracting iridescent color.

Now, as soap molecules are added to water (Lessing, "Understanding Chemistry" page 102, MENTOR New American Library, October 1959 Printing) they rush to all surfaces to orient themselves in a boundary layer one molecule thick, "heads" in the water and "tails" sticking up into the air or to the sides of the vessel. Molecules unable to crowd into these surface layers gather in the liquid in small spherical bodies, with tails coiled in the center to keep them out of the water and heads to the outside. When a soiled fabric is put in the water these spheres rush to the fabric's surface so as to attach the "tails" of the molecules to the fabric and thus to get out of contact with the water. But, in so doing they dislodge bits of the greasy film which bits hold the material particles that make the garment dirty and smelly. Other soapy spheres seize upon the bits of dislodged grease, completely surrounding them with single layers of molecules, preventing them from being redeposited on the fabric.

Split Rubric of Financial Control

Big size of an Organization is bad. Big size mitigates against personal administrative control over cost and program. The little shops are the efficient business shops. Their "nif" accounts mean something in terms of economy and program control. But, in big organizations the BIG BOSS just has no way of seeing what goes on across the board. He has the same administrative machinery for his big organization that Xerxes had -- the hierarchy of chiefs, any one of whom can disappoint him. Since 1494 the Top Man has had the Accounts of Mr. Pacioli to help him. But in big organizations there are greasy spots in the fabric of the organization. There is no way of "washing" these all out to obtain a brilliantly white fabric, shining as new. Accounting analysis is on a needle-in-the-haystack basis. It cannot clear out the areas of high cost and program lag well enough for today's requirements. Professional Auditors find it impossible to follow through fast to these spots -- the audit trace is too long and tenuous. And costs of the Audit become high. Big organizations need a direct approach. They need the power of the Rubric. But what is a Rubric?

The rubric is a split entity just as the split molecule of surface chemistry is a split entity. Both are useful constructions. The idea of a split molecule (nobody has ever seen such a molecule) has (1) revolutionized the entire laundry business; (2) has given medical science a new understanding of life processes; and (3) has produced many of the new wonder drugs.

So with the idea of the split rubric. It also is a construction. It can (1) give organization -- the biggest of organizations -- a new Go-Spirit as never before. (2) It can dig in as the split molecule digs in -- to get at high cost and unbalanced costs as nothing else possibly can. (3) It can balance the concepts of a program as planned against the facts of economic life -- against documented costs. (4) It can audit simultaneously with performance. These things have been done with EAM. These things the rubric can do with or without electronic equipment. How? By data balance combined with a budget/cost structure. I have seen the idea work with card equipment. I know it can be done.

The sketch, Exhibit A, will explain the Rubric and show its structural resemblance to the split molecule. It shows the operating element of surface chemistry -- the split molecule -- compared with the operating element of the rubric control structure -- the split rubric.

Management Vectors

What is the organization requirement for rubric control? No special set-up, neither in the accounts nor in the organization. It will work with NIF. It will work with fund accounts. It will make both work better just as a bit of soap makes water work better in maintaining the usefulness and life of fabrics used to clothe our bodies. Rubrics will aid any accounting system to give management spotless administration.

Full benefits would accrue when the rubrics cover the entire organization. Rubric based vectors will measure deviations from projections as performance moves along the line of time in the accomplishment of the program objectives. As an illustration, there follows a listing of numeric values of rubrics for three months covering a group of Overhead Cost Centers, and of Labor Hours.

The circled figures in Table I have been entered on Exhibits B and C, to the left of the ZERO line. The zero values have been put on the line. And the remaining figures, to the right of the line. These entries give a scattergram of 126 rubric values. Exhibit B shows Management Vectors for Costs. Exhibit C shows Management Vectors for Labor Hours.

TABLE I

RUBRIC INDEX -- BUDGET DIVIDED BY
COST MINUS ONE, TIMES 100

Dollar Rubrics			Rubric Designation	Labor Hour Rubrics		
First Month	Second Month	Third Month		First Month	Second Month	Third Month
(18)	(7)	(17)	a	(5)	(3)	(6)
11	18	13	b	00	(2)	(10)
(19)	(21)	(23)	c	3	(3)	(6)
36	36	30	d	(10)	(10)	(13)
30	42	55	e	(34)	(47)	(55)
25	27	22	f	23	22	14
(13)	(6)	(16)	g	(9)	00	(11)
19	13	15	h	00	(1)	(7)
11	(9)	3	i	(13)	(13)	(16)
22	17	15	j	5	2	(2)
(4)	(1)	00	k	(23)	(15)	(14)
4	9	10	m	8	7	2
10	13	10	n	(17)	(15)	(17)
14	12	7	p	3	00	(4)
13	14	10	q	(2)	00	(2)
7	10	4	r	3	00	(5)
6	14	12	s	(9)	3	4
2	6	(3)	t	7	4	(2)
267	83	36	u	(14)	(10)	(10)
4	00	5	v	12	12	12
12	16	17	w	(37)	(29)	(25)

What is a Vector? What is it good for here? In arithmetic we deal with numbers that represent fixed quantities. In algebra, the numbers may be constant or they may vary. But in any problem the numbers in algebra remain constant throughout the consideration of a particular problem. In the management of a big organization another mathematics is needed. This is the mathematics of mechanics, namely, Vectors that can measure direction and degree of change. Management's problems are constantly changing. These lie in the "fluid environment of exploding growth" emphasized by General Ward (ibid page 21). Such problems have to be solved quickly before they offer difficulties. For example, all fires are the same size when they start -- little! The damage they do depends upon how fast they are discovered and how well they are fought. So with problems in large orgainzations -- the damage can be controlled and excised if caught in time. Rubric Vectors can accomplish this.

As indicated above, the two scattergrams, Exhibits B and C, are based on hypothetical data as listed on Table I. Management vectors are drawn on the two Exhibits. Scanning the vectors shows several features.

Exhibit B: (1) There are unused Funds in 14 Cost Centers -- in 8 of these, for the three periods. The basic data indicates that about $550,000 in Funds lies inert, unused, and wasted over the three periods, or about $180,000 per month. (2) Cost Estimates have been overrun in three centers. Hypothetical basic data indicate the overrun is progressive, increasing at the rate of about $11,000 per month.

Exhibit C: (3) There is wasted labor time in two Cost Centers, "f" and "v". Basic data indicate these wasted hours are on the order of 8,000 hours per month, made available to these two

centers but not used for productive purposes. (4) There is an overrun of labor time in 7 Cost Centers. Basic data indicate these overrun hours amount to about 34,000 hours. Cost of work estimates, therefore, will be correspondingly overrun -- unless the direction of the vectors can be drawn from the left hand zone into the center zone, and more funds secured from the Customers.

In addition numerous observations can be made upon the behavior of individual Vectors. The exhibits follow:

EXHIBIT A — TWO CONSTRUCTIONS
Alpha & Beta

Construction Alpha, the split detergent MOLECULE.
HEAD, the soluble sodium half molecule.
TAIL, the insoluble fatty stearate half molecule.

Construction Beta, the two-part RUBRIC.
HEAD, the intangible part, the budget or program allocation of funds. The assignment of appropriated resources. The "B" in the Rubric-Index Formula.
TAIL, the cost or expended resources - Labor, Material, Expenses supported by individual documents. The "C" in the Rubric-Index Formula.
RI = (B/C - 1) 100

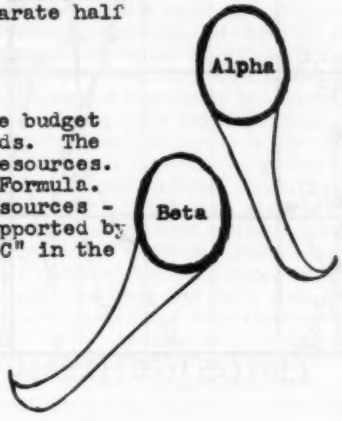


EXHIBIT B — Management Vectors On Costs

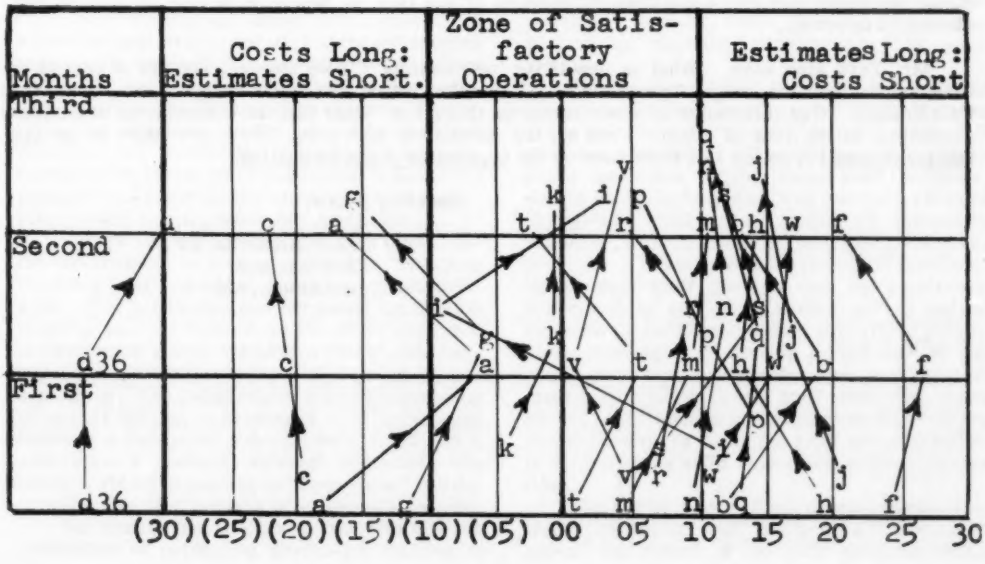
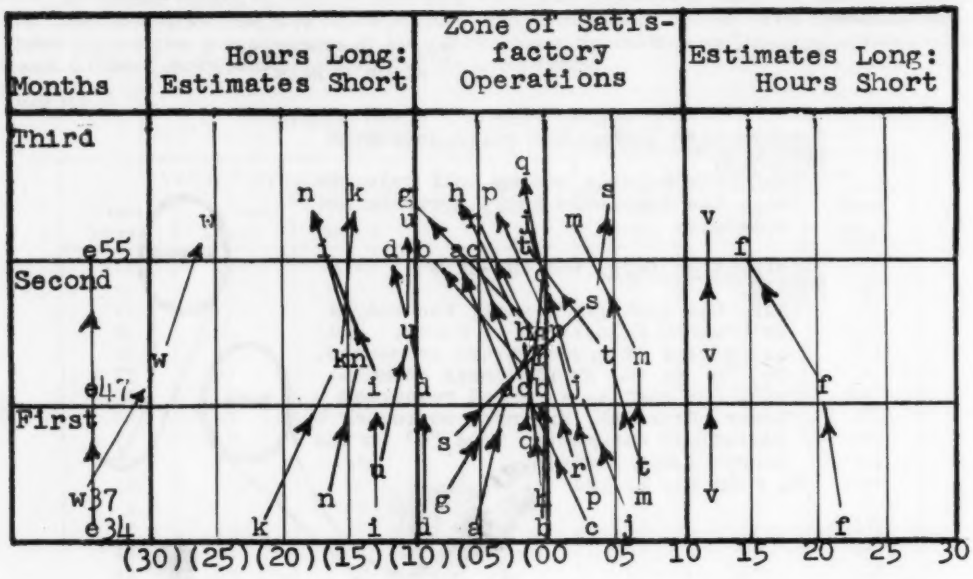


EXHIBIT C

Management Vectors On Labor Hours



Mr. York says, "Management controls and accounting techniques will generally be no better than the people operating the system." I will reply in paraphrase, "An automobile generally will be no better than the people who have to drive it." Both statements are patent nonsense. Mr. York's major premise, namely, qualitative differences attach only to people, is wrong. Hence, his conclusion is in error.

Mr. York also asks, "What is new in the 'new concept'?" My answer, The use of cost as the base rather than the budget "guesstimates." In other words, the use of Budget/Cost rather than Cost/Budget. Our difference in views center on this point: I say that the denominator of business economics is the cost of effort -- and not the estimate of such cost. There are books on the economics of cost but as far as I know none on the economics of guesstimating.

Sincerely yours,

/s/ Leo J. Richards, CPA
Cost Engineer
Brookmont, Md.

WHAT IS "ON-THE-JOB" PERFORMANCE, LEARNING OR TRAINING?

Harold F. Albertson, Assistant Chief, USAAA, for Staff Management, Headquarters, United States Army Audit Agency

Learning and training are like the well-known horse and cart; they must be properly harnessed to accomplish a job effectively. Placing the proverbial cart before the horse is tantamount to wasting a great deal of training "horsepower" on "raw material" which may never reach the end product. So, when we in our professional work refer to the singular phrase on-the-job training and its importance to the continued growth of an organization, are we all talking about the same broad concept? Or are we construing this vital aspect of staff development in its narrowest sense, namely that which fits conveniently into a special training category prescribed for time and dollar budgeting? Perhaps we even believe that on-the-job training is fine provided it goes on "in the next room" so that productivity will not be affected.

In looking back over the years in which our accounting and auditing experience was acquired, can we distinguish the time that was devoted to on-the-job learning from that devoted to pure productivity? Can we even remember the hours that were spent in sharing our knowledge with subordinates and colleagues? It is quite likely that the separation of learning from productivity is a practical impossibility since whatever progress one makes through the years is admittedly based upon continuous development. It is perhaps even more likely that unless one has been formally engaged in teaching, the time devoted to guiding others is completely submerged in his own productive experience.

One of the distinguishing characteristics of a professional man is the ability and willingness to maintain his technical knowledge on a current and proficient basis. While attendance at technical courses and reading of professional literature are effective means of cultivating this attribute, the translation of knowledge thus obtained to improved job performance requires the guidance and assistance of an experienced supervisor under actual productive conditions.

Except for a more sophisticated cloak, on-the-job training is nothing more than "learning by doing" with an added ingredient called guidance. For all intents and purposes, on-the-job training may be defined as the effort expended in developing a staff member's technical knowledge and skill while engaged in regular job assignments. The added ingredient called guidance is usually all that is necessary to bridge the gap between a receptive subordinate's mind and a supervisor's counsel, although concededly the latter's ability in passing on "know-how" will determine the effectiveness of on-the-job training.

We should not, of course, oversimplify the mechanics of perfecting on-the-job training in every situation. Neither should we relegate the concept to a one-time program for new hires and newly assigned staff members, nor entrust it solely to training specialists. Changing policies of an agency may require specially designed instruction to satisfy particular needs; however, the training and learning roles of supervisors and subordinates during work assignments remain substantially unchanged. Every staff member having permanent or temporary authority to supervise others has an obligation to attempt to develop the potentials of his subordinates through the sharing of experience in appropriate situations, offering clear and meaningful suggestions, and giving constructive criticism. Failure to do so indicates a supervisory deficiency no less serious than the improper discharge of technical responsibilities and may require appropriate action by management officials. The converse is also true. Every subordinate staff member has a responsibility to evidence receptiveness to learning, to keep his mind open and alert to improved methods of job performance, and to inquire "why" when he does not fully understand an assignment or its performance aspects. A failure in this responsibility reflects a professional deficiency that is inconsistent with the desired caliber of a quality staff.

In the field of auditing as in any other financial management area, staff assignments can usually be divided into identifiable phases of activity which lend themselves quite easily to sequential application of on-the-job training and learning. In audit, these phases may be categorized as planning, performance and completion.

The planning phase of an audit usually holds the key to the ultimate success of the assignment and is therefore particularly important for staff guidance purposes. All auditors, particularly junior and other inexperienced staff members, should be made fully aware of the over-all audit objectives, local areas considered especially sensitive, and the basis for developing the audit program. The latter requires adequate familiarity by each staff member with the significant aspects of the accounting system survey and the methods of verification that will afford proper audit coverage. Following preparation of the audit program, preferably with participation and/or comments by all staff members, there should be full understanding between supervisors and subordinates as to the audit steps to follow in attaining the audit objectives within budgeted time.

The performance phase of an audit necessitates continuing staff guidance and review to assure fulfillment of the audit program within

time allotments or need for appropriate revisions therefrom. In working relationships between supervisors and subordinates, every audit situation provides a medium for on-the-job training in the skills and knowledge which the subordinate has not yet acquired or perfected. Difficulties in tracing transactions, analyzing findings and formulating conclusions require the assistance of an experience supervisor who can place the subordinate on the right track and make maximum use of the data developed up to that point. In scheduling periodic seminars or meetings during the course of an audit, a skilled supervisor can foster professional kinship among all members of the audit team and at the same time can keep them informed of the participation by others, the general direction that the over-all assignment is moving, and provide opportunities for general discussion of significant findings. Questions concerning audit practices, reasons for program changes and other matters requiring explanation or clarification, can be discussed in an atmosphere of technical equality and with maximum benefit to staff development.

In the final phase of an audit the need for auditor training is particularly apparent. To develop ability (1) to recognize materiality and significance of audit findings and (2) to coordinate them satisfactorily into logical and usable form for report drafting and use at the exit conference requires constant counseling and guidance by experienced supervisors at the highest levels. It is also necessary for able report writers to assist in the cultivation of an auditor's writing skill, to develop a facility for the clear statement of audit conclusions which cannot be misinterpreted by nor be offensive to the recipients. Use of the red pencil alone, without adequate and acceptable explanations underlying revisions of drafts prepared by subordinates, will not accomplish this objective. Training in good report writing and in the proper use of English requires constructive suggestions as well as continuing practice. It is essential therefore that staff members see and understand why a finally accepted report is considered better than their own original drafts.

No one can seriously challenge the statement that every year of one's experience, if progressive, must include learning to some degree. Can we then in good conscience accept supervisors' frequent excuse of "no time and too busy" whenever the subject of on-the-job training is raised? As we progress to supervisory levels, devoting a portion of our so-called productive time to the development and training of subordinates should become a purposeful activity that we will recall with as much satisfaction as a well performed audit.

It will indeed be a great day in the lives of staff managers (i.e., persons having that title or inherent responsibility) when on-the-job training is universally recognized for what it really is and what it definitely isn't. More importantly, the concern of top management about organizational stability and suitable understudy planning for key positions, will give way to renewed interest in the development of careers for individuals as individuals.

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NAVY USES CONTRACT AUDITORS TO REVIEW AND EVALUATE CONTRACTORS' COST ESTIMATES SUBMITTED AS A BASIS FOR NEGOTIATION OF CONTRACT PRICES

E. T. Cook, Contract Audit Division, Office of the Comptroller of the Navy

The views expressed herein are those of the author and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

Navy Department procurement activities have been using the Navy Comptroller's contract audit staff for evaluation of contractors' cost estimates and as a result have been able to effect substantial savings in many contract prices negotiated.

The term "cost estimates" as used in this article refers to contractors' estimates of anticipated or run-out costs submitted for such purposes as negotiating initial firm prices, negotiating initial target prices under fixed price incentive contracts, negotiating final prices at a midway point in contract performance under price redetermination contracts, and agreeing upon estimated costs for purposes of negotiating fees under CPFF contracts.

Many people in Government and some outside who are not familiar with the techniques available to and used by auditors in evaluating contractors' cost estimates have assumed that auditors can be helpful only when costs recorded on the books are under consideration. Actually the possibilities for errors and overstatements by contractors which can be located and pointed out by contract auditors have proved to be as great or greater in respect to cost estimates than in connection with recorded costs.

One of the important things to keep in mind is the manner in which cost estimates are put together by contractors. If the estimates were made "by guess" and "by gosh," or with nothing but a slide rule, then there would not be much that an auditor could do. But this is not what we find. Normally, when an important contract is under consideration, estimates are very carefully prepared indeed, and this is natural since the estimate can mean the difference between getting the contract and losing it. The different factory operations which will have to be performed are listed -- then costed, using a combination of past experience and an educated guess about the future. Materials to be purchased are identified and discussed with prospective subcontractors to obtain their ideas on price. Overhead or burden rates are forecast under conditions of optimum and minimum prospective plant volume. Contingency factors are included. Frequently, there is actual cost data available from the past production of a somewhat similar item. Now all of these things have aspects which an auditor can get his teeth into, so to speak.

However, the techniques employed in evaluating cost estimates are naturally quite different from those used in auditing recorded costs. With the thought that these techniques may be of some interest, examples of steps in the review program are set out below according to the major cost elements usually involved.

The review program is normally applied on a test check basis in accordance with modern auditing concepts which, of course, contemplate extension of the tests where conditions are found which indicate the necessity for additional coverage. Also, as in other audit assignments, the auditor is expected to exercise his professional judgment by the selection and use of means appropriate to the circumstances.

There is one other important point to be made before discussing the procedures used in these reviews. It has been Navy experience that close coordination between the cognizant Navy Technical Inspector, such as the Bureau of Naval Weapons Representative or the Inspector of Naval Material, and the auditor is most helpful. This can be readily understood by a simple example -- the Technical Inspector is likely to be in the better position to make a sound evaluation of the need for the estimated number of man hours and to know the types of labor required to produce the item in question. The auditor, on the other hand, is in the better position to pass upon the estimated cost or dollar sign placed on those man hours. Similarly, the Technical Inspector usually knows how many units of what kinds of material are required to produce the end product whereas the auditor can better evaluate the estimated cost giving consideration to latest prices, method of treatment of cash discounts, etc.

If the auditor is not already thoroughly familiar with the contractor's plant and production techniques, he normally makes a careful survey, with emphasis on the particular contract or proposed contract, as an essential prerequisite to the commencement of the accounting review. Such a survey includes not only the cost recordation procedures, but also production processes.

Examples of Steps in Review Program

Direct Labor

(1) Determine credibility of standard hours shown on operations sheets by examining time studies and/or other data utilized to establish standards.

(2) Review labor hours projected by the contractor for the various labor categories and the estimating procedures followed.

(3) Determine whether contractor has included any unsupported contingency.

(4) Evaluate the reasonableness of the labor rates used for pricing the estimated direct labor hours by performing the following:

(a) Ascertain current rates by labor classification by checking to payroll records and/or records on file in personnel department.

(b) Review union contracts and related cost of living index for possible wage changes.

(c) Examine policies governing merit increases and promotions.

Direct Material

(1) Obtain a priced bill of material or other listing that supports contractor's proposed material cost. Review the prices shown thereon and verify a representative number to current price records maintained by purchasing department. Note any scrap, spoilage or contingency factors and segregate such costs for individual consideration and determination.

(2) Review unit material requirements per bill of material and compute total contract requirements. Then determine reasonableness of costs by the following:

(a) Compare the quantity shown in support of contractor's estimate to complete together with quantities used to target point with those quantities shown in bill of material.

(b) Verify pricing by reference to purchased costs, purchase orders, commitments, bids, catalog or inventory prices.

(c) Discuss findings with Technical Inspector and obtain his opinion on reasonableness of quantities, quality and kind.

(d) Compute necessary adjustments for excessive quantities, incorrect prices, obsolete and unnecessary materials, etc.

(3) Review contingency factor.

Manufacturing Overhead

(1) Review overhead experience and determine reasonableness of projected rates in light thereof and audit experience to target date.

(2) Eliminate overhead applicable to any base costs questioned by applying contractor's proposed rates thereto.

(3) Evaluate projected overhead rates on the results of the following audit steps:

(a) Compare burden centers in estimate to complete with those utilized to target point and reconcile any differences.

(b) Utilize acceptable overhead experience up to target point and consider any known or anticipated deviations therefrom for run-out period.

(c) Review overhead budget in light of acceptable past experience and reconcile any substantial differences.

(d) Review budget relating to base labor in light of acceptable past experience, present work backlog and availability of labor in run-out period.

(e) Make appropriate adjustment to direct labor base for any adjustments resulting from evaluation of the direct labor estimates.

General and Administrative Expense

(1) Ascertain acceptable overhead experience up to target date and consider any known or anticipated deviations therefrom for run-out period.

(2) Review budgeted base costs in light of acceptable past experience, present work backlog and anticipated new work.

(3) Compute overhead applicable to base cost questioned by applying contractor's proposed general and administrative rate thereto.

Examples of Savings

The information below is taken from actual case files. In every case cited, the exceptions found resulted in savings of over $100,000.

Labor

(1) Labor cost of a manufactured part was computed by dividing the total allocable labor cost by the number of completed units. The auditor found that the contractor's unit price was based on only about 12% of the total units that were produced. The Contractor conceded that the unit labor cost should have been about $19.00 instead of approximately $92.00. This amounted to a reduction of $73.00 per unit.

(2) The contractor classified labor as production labor bearing an overhead rate of 185.8% instead of engineering labor with an overhead rate of 110%. This made a difference in overhead cost of $392 per item, plus applicable general and administrative expenses.

(3) Projected labor was developed by using the average cost incurred by each work order from inception of the contract to the point of redetermination; and multiplying by the number of units to be completed. This method burdens the run-out portion of the contract with the start-up cost, and does not give consideration to learning efficiencies. For these reasons, the labor projection was questioned and as a result was revised and was reduced.

Material

(1) To substantiate the projected material costs, the contractor submitted a representative list of major suppliers and their estimated costs. An analysis of these lists showed that added to the material costs were various percentages ranging from 3% to 100% for scrap and safety factors. These factors -- applied without benefit of experience -- were questioned by the auditor.

(2) An analysis of material listings revealed

a number of items which were incorrectly stated on the contractor's proposal. For example:

(a) A major supplier's cost was overstated,

(b) Items already in overhead were again included as direct material,

(c) Certain engineering costs were reflected as material and also as engineering.

(3) The contractor proposed productive material cost for a follow-on contract on the basis of the bill of material cost of the last production unit of the initial contract plus an allowance for a market increase. It was claimed that the percent of market increase had been computed on the basis of the increase in unit prices of materials purchased for the follow-on contract compared to the unit prices paid under the initial contract. Upon analysis of the computation of the increase factor, it was discovered that the percent of increase applied has been realized on only a small number of high value items. Therefore, adjustment was made to reflect the percent of increase to the total bill of material.

Overhead

(1) Improper projections of expected work load for the period of contract performance was found by evaluation of the contract and over-all production schedules.

(2) General and administrative expenses were found to have been allocated to proposed costs of a nature that did not properly belong in the base for distribution of these expenses.

(3) The auditor eliminated overhead applicable to a decrease in the efficiency factor included in manufacturing labor. The decrease in efficiency factor was based on experienced costs on a predecessor contract.

In conclusion it is recognized that there are, of course, other yardsticks for evaluating estimates and some of them are undoubtedly valuable, as, for example, carefully compiled records of costs of completed previous contracts. In practice, however, it seems that thre are so many changes between one contract and another even for substantially identical products, that it is unsafe to rely entirely on these other yardsticks. They certainly cannot take the place of an on-the-spot analysis by professional accountants and engineers. These men have the advantage of first-hand experience with the contractor's plant, organization, estimating procedures, pricing procedures, budget procedures, internal controls, and accounting systems, all of which play a particularly important part in the evaluation of cost estimates.

A NEW APPROACH FOR A SERVICE-WIDE REPORTS SURVEY

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Memphis AF Depot, President, Memphis Chapter, ASMC

We managers in the field have often noticed voluminous, detailed and weighty reports being collected, merged, manipulated, "massaged," consolidated and forwarded to higher headquarters. Often we doubt the usefulness of many of these reports and request the originating command to evaluate them. Many times we are advised that the reports are very important to management and will continue in use.

The next time we process these bulky reports, we have the same doubt in our minds. The volume of detailed management data required at higher levels of command appears to be inconsistent with the current concept of decentralization of management responsibilities to the lower levels of command. At the operating levels, it is reasonable that detailed management information is required to properly perform prescribed functions. However, in many instances, we find the same detailed information required by higher headquarters and on up the ladder.

A new approach would be to question every report received at higher headquarters which weighs over a specified amount and contains more than a specified number of pages. Any larger report might be extremely difficult to analyze, draw conclusions and take required management action within a reasonable length of time. Reports exceeding the standard weight or volume could be eliminated or condensed to fit the standard.

This type criteria was once applied to a report containing about 32,000 pages and weighing approximately 320 pounds. As a result, it was abolished. Studies of other voluminous reports can and should be conducted to reduce size and/or frequency of submission of other similar weighty reports.

If you adopt this proposal for your next reports survey, be sure and alert all manpower staff functions to collect the manpower savings up and down the organizational ladder.

COMPTROLLER SYSTEMS PROGRAM -- A PROGRESS REPORT

Dr. Claude D. Baldwin, Assistant for Systems, Office of the Comptroller of the Air Force

I will present DOD Directive 7040.1 in perspective with AFR 170-6, with the Comptroller Systems Program, and with some existing or planned Air Force Manuals. Also I will point out some of the major program areas and projects which remain to be done in order (1) to implement the DOD directive, and (2) to achieve a complete financial management system for the Air Force.

Let us first take a look at the DOD directive in more or less general terms.

DOD Directive 7040.1

DOD Directive 7040.1 is titled "Program for Improvement in Financial Management in the Area of Appropriations for Operation and Maintenance." It was published under date of 29 May 1959 after being reviewed and commented on while in draft form by the three services. The Air Force commented on the drafts in May and September of 1958. Without going into details, suffice it to say that most of the Air Force suggestions were reflected by omission or incorporation into the final version.

The directive -- consisting of 14 pages with a three-page attachment on glossary of terms -- has as its purpose:

First, to establish basic policies for the development of planned programs for improvement of financial management in the areas of appropriations for operation and maintenance;

Second, to have developed and approved a plan with specific time schedules for completion of such programs.

For the most part, the policies and principles primarily concern themselves with the two functions of budget, and accounting and finance, including financial reporting.

I believe a brief, but fair and accurate, synopsis of the major points in the directive are:

1. It calls for a single account structure to be used for programming, budgeting, accounting, and reporting.

2. It provides for continuation of the statutory and traditional practice of the U.S. Government of financing operations on an obligational basis, i.e., the authority to create an obligation, as opposed, for example, to an expenditure basis.

3. It prescribes cost-based budgets both to justify and to administer O&M appropriations.

4. It requires use of the accrual basis of accounting with financial accounting for property as an integral part of the system.

5. It requires development of a time-phased program to implement the stated policies, principles, and objectives. The program must be submitted to the Office, Secretary of Defense (OSD), by 29 November of this year for approval. The approved program is to be returned to the Air Force by February 1960 for implementation. Quarterly progress reports must be submitted to OSD. In addition, our procedural instructions -- whether they be in the form of manuals, regulations or other -- required to implement the program must be approved by OSD prior to their effective date. And last,

6. "It should be assumed that implementation of the required program must be completed 1 July 1962."

DOD Directive vs. AFR 170-6, Comptroller Systems Program and Other Publications

Before discussing some of the specifics from DOD Directive 7040.1, perhaps it would be well to recall briefly the background on AFR 170-6 and the Comptroller Systems Program.

The Air Force Financial Management System was first introduced in March 1955 (in Air Force Pamphlet 170-1-1). After experiencing growing pains and with the anticipated passage of P.L. 84-863, the need became apparent for a body of basic and mutually supporting principles, policies, and objectives to guide our efforts in improving the capability of giving complete financial management service to command. Thus, came about AFR 170-6, which was published on 19 July 1956. A few months later -- in April 1957 -- came the initial publication of the Comptroller Systems Program Document for Improvement of U.S. Air Force Financial Management. The Program Document is designed to improve our technical systems and procedures in accordance with the tenets of AFR 170-6 on a time-phased schedule of work projects. Since the first Program Document, two successive versions of the Program have been published and distributed -- each was in more detail and greater scope than the preceding. However, the technical concepts have remained essentially the same from the first to the current edition of December 1958. As a parenthetical comment at this point, work has begun on a new edition of the document. We anticipate that the characteristics I have just mentioned will also apply to it.

A word of caution! Any comparison between the Comptroller Systems Program and the principles and policies on which it is based with DOD Directive 7040.1 is somewhat like comparing a whole to a part. I want to make it clear that the DOD directive represents the part, in that it is oriented toward the O&M appropriations only, whereas AFR 170-6 and the Program based on it represent the whole, in that the latter pertain to the entire Air Force Financial Management System. That is, AFR 170-6 and the Systems Program apply not only to all appropriations,

but also to stock funds, industrial funds, management funds, etc. At the same time, we must be cognizant of the fact that the DOD directive, although limited by its title and stated purpose to the O&M appropriations, contains policies which are no doubt pertinent to the whole financial management system, if not explicitly then certainly by inference. In this connection, the directive states that operating budgets for the O&M appropriations should include costs of operation and maintenance programs to be financed under other appropriations -- we may reasonably assume these would include for example, the Air National Guard, and Research, Development, Test and Evaluation appropriations.

A final caveat! Space prohibits a comparison of all of the specific policies in the DOD directive with the comparable specifics in AFR 170-6 and the Program Document. As may be expected of such products of human endeavor, the semantic problem rears its head -- the terms and nomenclature obviously differ, if for no other reason than different individuals use the English language in different ways to express what both may firmly intend to be the same concept or meaning. In my comparative analysis, therefore, I hope to avoid "semantic contentiousness" but will attempt to compare the concepts as fairly and accurately as I can even though they may have different "labels."

For the purpose of comparison, I have selected those policies and principles which in my judgment are of the most import. These policies are arranged in three broad groups -- Account Structure, Budgeting and Funding, and Accounting and Financial Reporting. I will first give the specifics from the DOD directive, and then associate them with the comparable specifics in AFR 170-6 and the Comptroller Program. Where it is appropriate, I will make reference to the publications which implement or are programmed to implement the specifics. To this extent, this presentation will be a progress report. All of the publications to be cited were or are to be produced in accordance with the Comptroller Systems Program. I want to emphasize that I do not imply that the implementing publications to be cited, and which are in existence, in every case implement exactly, totally, or only, the specific from the DOD directive.

Account Structure

As previously indicated, the DOD directive calls for a single, integrated account structure under the O&M appropriations. This structure is to serve the joint purposes of programming, planning, budgeting, accounting, and reporting. The structure should include two basic classes of accounts:

The first are called "summary" or "budget" accounts. They are for use in maintaining what we refer to as "fund" accounting (obligations), and in budgets and reports submitted to higher command echelons. The budget accounts are comprised of uniform "budget-program accounts," and -- under each of them -- a logical grouping of "budget-activity accounts." Both the budget-program and activity accounts -- or the two levels of accounts below the appropriation level -- are to be prescribed by OSD. The program accounts will be uniform for all three services. The activity accounts will be devised individually for each service but will be uniform and comparable to the extent feasible. Further, the activity accounts will be devised to meet the criteria of:

1. Identification of primary functions.
2. Identification of organizations at operating level.

The second class of basic accounts in the structure are "cost accounts." These, for use at operating levels to support the budget-program and activity accounts, are to be devised by each of the three services. OSD does not prescribe any specific levels of cost accounts. The cost accounts are to meet the criteria of:

1. Identification of secondary functions.
2. Identification of organizations at operating level.
3. The needs of local management.
4. They must be capable of being aggregated, or distributed by cost accounting methods, into accounts prescribed for use in submitting data to higher command echelons. Such data includes the President's Budget, budgets and reports in terms of budget-activity accounts, uniform cost reports for comparable types of activities, etc.

Let's now look at comparable specifics from AFR 170-6 and related Comptroller publications.

First, paragraph 2, AFR 170-6 states in part "the account structure will be a single, uniform classification which will be integrated to serve all management purposes -- including planning, programming, operations, budgeting, accounting, reporting, auditing, management analysis, and so forth." A general description of the components of the Air Force Account Structure, their respective purposes and relationships, are given in Chapter 1 of AFM 170-7. Program Area 3 in the Program Document, containing 12 work projects, covers the work required to produce the complete Air Force Account Structure, which is contained (or to be contained) in AFM 170-7. Only three of the chapters of AFM 170-7, however, can be correlated directly with the three major sections of the directive, namely, Chapter 1, which gives the purpose of the account structure, its major components, relationships among the components, and so forth; Chapter 2, which contains the Appropriation and Budget Code; and Chapter 7, which contains the Expense and Cost Account Code.

Next, although the basis of classification for

the appropriation and budget accounts are conceptually similar to that expressed in the DOD directive, it has been the Air Force experience that OSD does not necessarily agree as to the aggregation and subdivisions heretofore submitted by the Air Force as the expression of a classification in accordance with the assignment of functional responsibilities among organizational entities of the Air Force. With respect to the terms applied to the levels of budget accounts, it is clear that the Air Force uses a different nomenclature from that adopted by the DOD directive. Moreover, the Air Force budget subproject account level, for which fund accounting is presently maintained, would clearly be inconsistent with the policies of the directive. The correction of this nomenclature to conform with the directive can be accomplished with relative ease by suitable changes to Comptroller publications. The elimination of budget subprojects in O&M area has been an expressed objective of the Comptroller Program for sometime in accordance with the policy of maintaining fund accounting at the highest practicable level consistent with management equirements.

Last, it is the objective that the Expense and Cost Account Code should represent a subsidiary accounting classification directly related and relatable to the budget accounts within each appropriation or fund account. In this sense the directive and the Comptroller publications are the same in concept and objective. It should be noted, however, that the present Expense and Cost Account Code contains more than just the "operating expense" accounts with which the DOD directive is exclusively concerned in the area of O&M appropriations. The Expense and Cost Account Code includes operating expense accounts for industrial and management funds and non-operating expense and loss accounts applicable to all appropriations and funds of the Air Force. Finally, the Air Force has several levels of classification in the Expense and Cost Account Code which would have to be modified to be consistent with the terms used in the DOD directive for the first two levels below the appropriation -- i.e., program and activity.

There is considerable similarity between the DOD directive and AFR 170-6 and its related Program publications on those components of an account structure which are treated by the directive. We all recognize that many more account classifications are necessary before we can have a complete, integrated financial account structure, or even implement the basic budgeting and accounting policies contained in this DOD directive in the area of O&M appropriations.

Additional Account Codes Necessary for An Integrated Financial Account Structure

The Air Force obviously considers those accounting classifications necessary to meet present financial management requirements which have been programmed under the Comptroller Program. Since the classifications are more completely described in the Comptroller Systems Document and in AFM 170-7, I will not tarry by commenting on any one of them. My only point here is to emphasize that DOD Directive 7040.1 cannot be considered alone when we must meet many other requirements of equal or greater complexity before we can achieve a complete financial management system for the Air Force. I cannot refrain from adding one more specific comment on a classification which certainly has long been a requirement in the O&M appropriation area, namely, the object classification. The DOD directive is silent on this point. We have hitherto assumed and continue to program that, in addition to the budget and cost accounts referred to in the directive, we shall be required to present the President's Budget in terms of object classes in accordance with the Bureau of the Budget Circulars.

Budgeting and Funding

The second general group of specifics for comparative analysis are under the caption of Budgeting and Funding.

In presenting the budgeting and funding policies in the area of the O&M appropriations, the DOD directive prescribes the use of cost-based budgets for the support of appropriation requests in the President's Budget as well as for the justification of funding and program approval in the budget execution process, that is, after appropriations are made and apportionments, allocations and allotments are requested to "fund" the approved operating budget. The directive uses the term "operating budget" to include both the President's Budget and what we now call the "operating budget" or "operating plan." Therefore, when I use the term "operating budget" I will be referring to both, unless otherwise specified.

With respect to the echelon at which the operating budget is to be prepared, the directive prescribes that:

1. Operating (cost-based) budgets are to be prepared for purposes of the President's Budget at the highest command echelon which has the capability and information necessary to translate program objectives into budget estimates; and

2. Operating budgets for purposes of execution of the budget are to be prepared, presented, and justified in command channels with origination at each operating unit. Each successive echelon above the operating unit will review, adjust, and approve the operating budgets submitted by lower echelons up to and including Headquarters USAF, OSD, and presumably the Bureau of the Budget.

The directive envisages budgeting, and therefore accounting, for total costs, both locally funded and non-locally funded, with differentiation being made between the two. In general, the

Directive applies the principle that only "controllable" costs of a program or portions thereof will be budgeted for by a given operating unit or echelon. That is, budgeting for such costs requires the capability of operating agencies and their operating units to identify those costs which each of them is responsible to control and which, in fact, each does control. Presumably, the principle of "controllable" costs is equally applicable to both funded and non-locally funded costs. Some specific policies are contained in the directive with respect to the types of costs for which each operating unit must budget.

The first is, that generally, each operating unit must budget for the cost of consumable materiel and work or services furnished for use in the functional performance of the operating unit, including the cost of such materiel, work or services provided by another operating agency or operating unit.

The second is that an operating unit will not budget for costs it cannot control to a significant degree or for which it is not functionally responsible.

An example of costs which cannot be controlled to a significant degree is given as military personnel costs in combat force units -- e.g., military personnel in SAC bomb squadrons and in ADC interceptor squadrons.

An example of costs for which an operating unit is not functionally responsible is given as installation support costs where the operating unit is a tenant and has no assigned responsibility for installations support. In this latter connection, however, additional policies are contained in the directive and will be discussed later under "Funding."

The cost-based budget envisaged by the directive requires that the operating budget, and consequently the accounting system supporting it, must be presented in terms of obligations and accrued expenditures for those budget accounts for which separate obligational limitations have been established.

With respect to the content of the operating budget, the directive requires that:

One, the total costs of all accounts will be used and presented as necessary to support the costs of all the budget accounts (first two levels below the appropriation), and these costs will be reconciled with the total accrued expenditures and with the total obligations incurred for each fiscal year or other accounting period.

Second, significant differences between total costs, total accrued expenditures, and total obligations in any budget or report must be explained by a supporting analysis.

Third, cash receipts and disbursements should be budgeted only in total for the O&M appropriation and comparable segments of the other applicable O&M type appropriations.

Fourth, reimbursements, which when collected constitute a major portion of the cash receipts as traditionally defined by the Treasury Department, will be estimated in terms of earnings and anticipated earnings for the fiscal year. These reimbursements are to be shown by echelon of command and classified within each budget account by source. Reimbursements earned should not be offset against obligations, accrued expenditures, and costs.

With respect to funding policies the directive uses extensively the terms "operating agency" and "operating unit."

For our purposes, we can consider the term, "operating agency," to mean the same as it is defined in AFM 170-3 -- namely, an organizational unit to which funda are allocated. Generally, of course, this is a major command but not in all instances.

The meaning of the term "operating unit," however, differs significantly from the meaning we associate with an Air Force operating activity. The DOD directive explains operating unit as "each major organizational subdivision or entity made responsible for execution of an identifiable segment of a program.[5] It would include all identifiable activities under one command or management, whether in the field or at any higher level, such as an intermediate operating agency, an operating agency, or even a departmental headquarters." In the Air Force, the meaning of operating activity is an organizational unit of an operating agency to which funds are allotted. The significance of the OSD definition of operating unit as opposed to the old definition of operating activity is that the status of an operating unit is determined on the basis of being assigned responsibility to execute a segment of a program, and not on whether it is given an allotment. The importance to the Air Force funding system of the "operating unit" concept will become more evident when considered in conjunction with the funding policies contained in the directive.

The DOD directive states that subject to the latitude specified by the command echelon which approves the total operating budget, the total amount (funded and non-locally funded) of the currently approved operating budget for any operating agency or unit should be an annual limitation and authorization. This does not mean that an approved operating budget constitutes either a limitation subject to control and enforcement under Section 3679 or an authorization to incur obligations. An approved operating budget merely constitutes an authorized plan to finance and to execute a program.

Within the total amount of the currently approved operating budget would also be intermediate "target" amounts imposed for budget accounts; such target amounts would not be limitations or subject to 3679 violations. However, exceeding the annual limitation by any amount, and significant excesses over the intermediate targets on budget accounts, would require an explanation to determine the propriety of disciplinary action.

That portion of the total operating budget which requires the authorization to incur obligations (i.e., the locally funded portion) will continue to follow the present apportionment-allocation-allotment process. These apportionment actions would result in separate administrative subdivisions of funds and limitations on those budget accounts specified by the Bureau of the Budget or OSD. These separate obligational limitations would be in addition to the over-all obligational limitation on the O&M appropriation. Of course, these obligational limitations would be subject to 3679 control.

The directive prescribes that, within each military department, there should be only one allocation of funds to any operating agency or intermediate operating agency, and only one allotment of funds from any such allocation to each operating unit. When this policy is considered in conjunction with the meaning given the term, "operating unit," which I discussed before, it is obvious that the present funding policies of the Air Force may have to be modified. Suffice it to note here that the directive does permit some flexibility to the Air Force in that it provides that:

Minor tenant operating units may be jointly financed under one allotment from the same operating agency, if so provided by the regulations of the military department concerned.

Although it would be profitable to discuss other facets of the funding policies contained in the directive, an over-all comparison is made with the policies contained in AFR 170-6 and the related Comptroller publications on the general subject of budgeting and funding.

AFR 170-6 contains for the most part essentially the same provisions on budgeting and funding as we have just reviewed from the DOD directive. In fact, on certain points, such as the basis of budgeting, the content of an operating budget, and the accounting system to support it, and the general pattern of authorization and funding, the wording in the two documents are remarkably similar. We note, however, that AFR 170-6 concepts and wording pertain to the whole "operating budget" consisting of both the capital forecast and the operating expense forecast, whereas the directive is confined to only that portion which we have called the "operating expense forecast."

Although the similarities on many of these principles and policies between the directive and AFR 170-6 are numerous, there do exist some noteworthy dissimilarities which I summarize as follows:

First, AFR 170-6 spells out in more specific terms than the DOD directive the "how" of preparing, presenting, and approving operating budgets -- both the capital and the operating expense portions. In this sense, perhaps, the AFR contains some procedural detail which might well be incorporated in the budget manual AFM 172-1 in due course. However, it is clear that before an operating expense forecast can, in fact, be made there must be the capability of correlating it to its companion and supporting portion -- the capital forecast. The treatment of assets both in budgeting and accounting must be an integral part of the overall financial management system, before the provisions of the DOD directive with respect to materiel and real property can be implemented. (Particularly such assets financed by the O&M appropriations.)

Second, AFR 170-6 and existing policies of the Air Force require that each operating activity will budget and account for all resources needed to perform its functionally assigned responsibilities. However, we recognize that by virtue of the present assignments of functional responsibilities among the commands of the Air Force and their operating activities, certain costs are budgeted for centrally for the whole Air Force -- e.g., military personnel, centrally-procured materiel, etc. Hence, in practice, there may be some knotty problems to resolve as to the specific applicability of the policies of the DOD directive within the organizational structure of the Air Force.

Third, there exists a difference in meaning and in applicability between the terms "operating unit," as used by the directive and "operating activity," as used by the Air Force. As stated before the funding policies and practices of the Air Force may need to be modified to implement the directive. I suspect that the general policies contained in the directive may require additional clarification; some work has already been done on this score by the Comptroller staff in discussions with OSD.

As a final comment on this phase of the examination, I want to call your attention to the Comptroller System Program and the publications in which the policies are planned to be implemented. To implement DOD Directive 7040.1 so as to provide the capability to the Air Force for preparing cost-based budgets, additional projects in Program Areas will have to be completed. With the promulgation of the first "package" of the Accounting and Finance century-series manuals, the bulk of the work remaining to be done is contained in the projects of the Area for the "Operating Budget System."

Accounting and Financial Reporting

The third major group of specific policies have been summarized under the caption of Accounting and Financial Reporting.

The policies pertinent to accounting and finance are commingled in the DOD directive with budget policies and reporting policies. Since the budget must necessarily be supported by the accounting and financial reporting system, I will discuss under this heading only those accounting and reporting policies which are significantly additional to the budget policies we have just reviewed.

The directive, of course, requires an accrual accounting system, which is implicit to providing the capability for cost-based budgets. It is equally clear that accounting on what has traditionally been called an "obligational" or "cash" basis will continue to be required; this fund accounting is to be an integral part of the overall double-entry accrual system of accounting.

With respect to the controversial question of depreciation accounting and budgeting in the Federal Government, the directive specifically provides that depreciation of facilities and equipment will be budgeted for only where a valid, recurring, management need exists for the information; moreover, depreciation computations are to be considered in special cost studies for management decisions. It would appear, therefore, that accounting for depreciation will be restricted largely to the areas of industrially funded activities and charges for services outside the government, similar to that now practiced by the Air Force.

The directive summarizes the broad basis of the accounting system by prescribing that:

One, it will be designed to permit the accurate and timely summarization of financial transactions so as to produce in one system of accounts the data required for budgeting, reporting, and day to day financial administration.

Two, it will provide that the actual record keeping facilitate audit, and financial transactions recorded in the accounts should be supported by documentary evidence maintained as long as required; and

Third, its design and maintenance, to the greatest practicable extent, should obviate duplication of recorded data at various command and management echelons.

With respect to the locations at which accounting should be performed, the directive bases its criteria on the "operating unit" concept. The general rule, naturally, would be that each operating unit will maintain its own accounting records for those transactions for which it is responsible, without duplication of such transaction accounting elsewhere. In addition, the directive recognizes that, where feasible, suitable arrangements are to be made to provide a single accounting service where two or more operating units are located at the same base or other geographical location, or where small separately located operating units can efficiently and effectively be centrally serviced by a "host" or "support" operating unit.

The general subject of financial reports, and perhaps by implication nonfinancial reports, is treated by the directive in language so similar to that contained in AFR 170-6 that I shall condense my summary of this section. The directive provides that:

First, reports should be prepared at operating unit, operating agency and departmental levels, and the reports should be submitted through these channels with successive consolidations of the data therein with data provided by the accounts maintained at each successive echelon.

Second, cost reports should contain the amount of incurred costs compared with the amount budgeted for in the currently approved operating budget, on a cumulative as well as "for the period" basis; and "reconciliations of total costs and total accrued expenditures and total obligations."

Third, reports should contain, to the extent practicable, work measurements related to the applicable financial data.

Fourth, a narrative analysis should accompany the reports, as necessary, to explain major variances by item between actual costs and budgeted (estimated) costs in the currently approved operating budget, and between cost standards based on pertinent work measurements.

Fifth, the status of funds report should contain for each administrative subdivision of funds (allotment and allocation) cumulative data on obligations, accured expenditures.

Sixth, total cash receipts and disbursements will be reported on a comparative basis with the amounts budgeted for.

Seventh, a Section 1311-type report will reflect fund resources, unpaid obligations, and balance available for obligation, and

Eighth, a report on materiel status will reflect quarterly the total cost of consumable materiel on hand and in transit financed under the O&M appropriation, by materiel category and stock property class, together with a summary of changes in the Government's investment in the materiel, reconciled with data on inventory changes shown in the cost reports.

A final point on reporting, the directive provides that recurring reporting requirements should be held to a minimum of detail. I must also observe at this juncture that much clarification is needed by way of specific formats and details of the reports themselves before we would be able to say just how these reporting requirements will affect us and how they can be met with a minimum of detail and yet achieve necessary correlation of the data.

The comparison of these specifics with comparable specifics in AFR 170-6 and other Comptroller publications can be made.

I believe it a fair evaluation to say that, other than for differences in terms and in the arrangement of the policies, the basic concepts on accounting and financial reporting contained in AFR 170-6 and the Program Document are the same as those intended by the DOD directive. I shall, therefore, not dwell on a comparative examination between what appear to be like concepts. It must be noted again, of course, that AFR 170-6 and related Comptroller publications embrace a larger number of concepts and policies on accounting and reporting than those contained in the directive.

A word with respect to the Comptroller Program. There are work projects calling for the development of accounting and reporting procedures to implement AFR 170-6 in virtually all of the areas in the Comptroller Systems Program. Particularly applicable are those in Areas 4, 5 and 6 -- General Ledger System, Appropriation and Fund System, and the Operating Budget System, respectively. Likewise, practically all of the programmed AFMs in the 177 and 171-series will contain the detailed accounting and finance procedures and the financial and nonfinancial reporting procedures.

Summary

In summary of the points contained in DOD Directive 7040.1 as compared to similar points in existing or planned Comptroller and other Air Force publications, I believe it fair and accurate to say --

First, the comparable concepts are fundamentally the same. In fact, most of the individual specifics in each can be matched side by side.

Second, the differences which do exist are for the most part the result of differences in terms and coverage. The fact that AFR 170-6 and the Comptroller Systems Program based on it were intended to be much broader in scope than is the DOD directive naturally explains some of the differences in coverage, and

Third, the DOD directive should not, nor do I believe it was intended by OSD to be considered by itself. As significant as the principles and policies are, there are many other basic policies required and a vast amount of work to be done in related financial management areas before the Air Force can fully implement an integrated and complete financial management system.

What remains to be done to implement the DOD directive?

The Air Force started to implement the DOD directive before it was even published, when in 1956, essentially the same policies were published and a time-phased program was developed in 1957 to produce the implementing procedures. Although the originally programmed target dates have not been met, there has been substantial work accomplished which has resulted in such manuals as 170-6, 170-7, 170-10, 170-12, 177-100, and numerous staff papers providing policy guidance. Certainly we recognize the significance and the sheer volume of work represented by the new manuals of the Directorate of Accounting and Finance. These new manuals and the supporting Statistical Services procedures have been accomplished in accordance with the policies under the Comptroller Program and will go a long way to form the basic procedural framework into which the final implementing instructions can be woven and properly related.

But we recognize, I am sure, that much more remains to be done. Moreover, progress in the future must be more rapid than that in the past, if the Air Force is to meet the date of 1 July 1962 for full implementation of the DOD directive and the operating budget concept. Only two complete projects scheduled in the Program were published last year -- one was the uniform general ledger account code in Chapter 10, AFM 170-7, and the other was AFM 177-100 on the general principles and policies of the accounting and finance system. This is not to overlook or diminish the importance of the substantial staff effort which has been devoted to the writing of the new accounting and finance and statistical services manuals. Moreover, this visible result under the Program does not reflect the extensive staff efforts which have been devoted to trying to resolve Air Force policy issues. Specifically, I refer to the work devoted to develop such basic building-blocks as a materiel and real property account structure and a command and organization code.

Perhaps as good an indication of the work yet to be done in the whole area of the account structure and, subsequently, in the related financial management systems and procedures, can be summed up by quoting in part from the final report of the Materiel Data Requirements Policy Group, which studied the area of account codes for some seven months:

"The majority of the data classifications cannot be confined to the data requirements of materiel and comptroller, but are, in whole or in part, equally applicable to other functional organizations and operations of the Air Force. From this it is apparent that standardization of data elements, classifications and their related codes cannot be accomplished separately for each of the various major functional areas or organizational levels of the Air Force. Therefore, it is recommended that the standardization of data elements, classifications and their related codes encompass all data requirements for all major functional areas and organizational levels of the Air Force."

THE MARINE CORPS CONCEPT OF FINANCIAL MANAGEMENT

Brigadier General Herman J. Nickerson, Jr., Fiscal Director, Marine Corps

The budget estimate for the Department of Defense for Fiscal Year 1961, now being reviewed by Congress, is more than $40.4 billion. This estimate is shared by the three military departments and the Department of Defense as follows:

	Amount	Percent
Department of the Army	$ 9.5	23
Department of the Navy	12.0	30
Department of the Air Force	17.7	44
Department of Defense	1.3	3
	$40.5	100

Of the amount shown for the Department of the Navy, the four direct appropriations which fund Marine Corps requirements amount to $902 million. When these funds are taken together with money in U. S. Navy appropriations needed for the support of the Marine Corps, the total required for Marine Corps use comes to well over $1 billion.

This does not appear to be any significant amount when it is placed beside the money needed for each of the other services. Nevertheless, it represents a sizeable portion of our national resources; one which, under other circumstances, might last a long time. For example, if Julius Caesar, in 44 B.C., began to spend at the rate of $1,000 each day, he would have had to live and continue to spend $1,000 each day, until the year 2697 A.D. to get rid of $1 billion. As far as Marines are concerned, this expenditure has to be justified. It has to be managed carefully to make it produce the highest possible "profit" -- "profit" being measured in terms of readiness to go to war or to land somewhere to prevent a war.

Justification and management of these public funds is not a matter to be relegated to the far upper reaches of command in the Marine Corps. We believe that the best evidence of what we need to do the day-to-day job of the Marine Corps is produced at the level where resources are actually used and where requirements first make themselves known. We believe that the responsibility for using resources effectively, efficiently, and economically is accompanied by the responsibility for planning that use; that is, the responsibility for determining requirements and making them known upward through the chain of command. We believe, also, that among the financial responsibilities which our commanders at every echelon must satisfy is that of accurately reporting the final use of dollar resources.

The Marine Corps uses the system of allotments and suballotments and administrative devices like planning estimates and operating targets in order to diffuse these responsibilities throughout its structure. This distribution of funds through the operating levels applies directly and primarily to only one of the four direct appropriations. This is the appropriation "Operation and Maintenance, Marine Corps." It is in this appropriation that we get the money for paying the expenses of our day-to-day operations--for the fuel and equipment used to train our troops and for the operation, maintenance, and repair of our facilities--our barracks, our heating plants, and our storage areas. It is this appropriation out of which we pay our civilian personnel and from which we get the money to pay for things like temporary additional duty.

Other direct appropriations are "Military Personnel, Marine Corps"--from which we get the money to pay our Regular Marines, to feed them, and to pay the costs of their transportation on permanent changes of station--"Reserve Personnel, Marine Corps"--which is the appropriation providing the money for drill-pay and for paying our reserve officer candidates--and "Procurement, Marine Corps"--which is the source of our dollars for buying capital-type items of equipment and ammunition. We participate as an activity in the appropriation "Research and Development, Test, and Evaluation, Navy," and we have our own revolving fund in the Marine Corps Stock Fund.

In contrast to "Operation and Maintenance, Marine Corps," these appropriations are administered almost entirely at Headquarters, Marine Corps. There are a number of good reasons for this. For instance, the distribution of military manpower is something which has to be controlled at Headquarters, Marine Corps. There has to be a central point at which we can keep track of our overall strength and of the different skills and rank strengths in the Marine Corps. This same central point is responsible for seeing that every Marine outfit gets its fair share of the manpower pool to do the job it has been assigned. The local commander cannot control the flow of Marine personnel into and out of his command, nor can he control the fluctuations in the strength of his command during the year. It would not be practical to have him administer the financial plan for paying his Marines or the costs of their transportation between stations--he can hardly know to what stations they should be sent in the first place.

"Procurement, Marine Corps" has to be administered centrally because of its inherent problems of control. Our capital-type items of equipment, especially our weapons, have to be standardized. This illustration may be extreme, but it is easy to imagine what could happen to the Marine Corps if the Commanding General at

Camp Pendleton, California, was forced to buy several thousand Winchester semi-automatic rifles while the Commanding General at Camp Lejeune, North Carolina, found that the best he could do would be to buy some Sharps buffalo guns.

Besides the nightmare this situation conjures up, there are the problems of competition between stations for the same product, contracting standards, and lead-times extending over several years of research and development which all go to make it more sensible and practical to administer the procurement appropriation at Headquarters, Marine Corps.

While the administration of these appropriations is not decentralized to commanders in the field, it is decentralized by staff function within Headquarters, Marine Corps. The staff officers who have the responsibility for planning and controlling the execution of personnel and procurement policies are also responsible for planning and controlling the use of money appropriated for these functions. They "sponsor" appropriations as the representatives of the Commandant of the Marine Corps by presenting them and by justifying and defending them in detail at every level of the budget review, including the Commandant, the Secretary of the Navy, the Secretary of Defense, the Bureau of the Budget, and the Congress.

Appropriation sponsors include certain of principal staff officers at Headquarters, Marine Corps. The Assistant Chief of Staff, G-1, is one of these appropriation sponsors. Since he is responsible for formulating and executing the Marine Corps manpower program, it is also his responsibility to sponsor the appropriation "Military Personnel, Marine Corps" which funds that program. The Director of Reserve, who is responsible for the Marine Corps Reserve subprogram within the manpower program, sponsors "Reserve Personnel, Marine Corps." The G-4 sponsors "Operation and Maintenance, Marine Corps" and "Procurement, Marine Corps" as a part of his responsibility for the Marine Corps logistics program.

While these officers have principal staff responsibility over each of the appropriations in their entirety, the administration of these appropriations conforms to the functional subdivisions contained in each of them. Money is allocated by functional subhead to subhead administrators who are principal staff officers themselves. These officers are responsible for distributing, or alloting, the funds to be used in carrying out the programs of the Marine Corps. This permits the Marine Corps to comply with the legal provision that there cannot be more than one allotment from each subhead to a single allotment holder.

The single allotment provision is the primary reason for the existence of subhead administrators. The system permits the administration of individual budget projects without hindering single allotments. Subhead administrators are not responsible for passing on the estimates and requirements for funds submitted by allotment holders in the field and at Headquarters, Marine Corps. They only issue allotments, each of which might be made up of money from several budget projects, or subdivisions of subheads.

Responsibility for Budget Projects are assigned to staff officers who are called "project sponsors." It is their function to review financial planning estimates from field commanders and allotment holders at Headquarters, Marine Corps, whenever these affect the particular projects they sponsor. Each sponsor weighs and balances the estimates which apply to him, and, based on his judgment as it is affected by overall Marine Corps needs in his area, he advises the subhead administrator on the funds to be taken out of his project and placed in allotments of funds.

All of this might seem like a lot of unnecessary complication just to diffuse financial responsibility, but it does have a double-barrelled administrative value. First it permits us to comply with regulations permitting only one allotment from one subhead to any one commander without decreasing his dollar resources. Within this one allotment, the commander can adjust his local financial plan by transferring funds between projects. He has to report these changes to the Commandant of the Marine Corps, only if the accumulated total of transfers from any project amount to ten percent of that project's authorized funds.

In the second place, this method allows us to make certain that all projects are in balance and that every commander gets his fair share of the money he needs to carry out his mission. The centralized control exercised by the project sponsors gives them an overall Marine Corps perspective without interfering with decentralized operations.

With each allotment goes a legal responsibility to guard against overobligations, overcommitments, and overexpenditures. Naturally, this legal responsibility carries with it an accounting responsibility. Not only does the allotment holder have to account for his use of the money to the Commandant of the Marine Corps, but he has to guard against using more money than he has been authorized. It would be impractical to expect him to keep an effective guard if he could not keep the records for the use made of that money.

The "mechanic" at Headquarters, Marine Corps, who makes this financial machine go -- who bolts the financial activity of the Marine Corps together and keeps its efforts pointed in the direction of producing Marine Corps "profit" --is the Fiscal Director of the Marine Corps. His staff responsibilities to the Commandant of the Marine Corps include a general mission of formulating financial policy and administering

fiscal activities so that our methods of financial management conform to the law, good business practice, and regulations issued by higher authority.

In carrying out his responsibilities, the Fiscal Director obligates no money. He signs no checks for the government. Nor does he pay out any government cash. He has no "conflict of interest." Although he does make allotments of appropriated funds in his capacity as a subhead administrator, he does not determine the size of those allotments. That responsibility belongs to the project sponsors.

On the other hand, the Fiscal Director does build the Commandant's financial plan with the material provided by the appropriation sponsors and the project sponsors, and he administers the overall execution of that plan. He makes sure that his construction of a financial plan conforms to overall Marine Corps policy by seeking the advice and recommendations of the Budget Advisory Group. This group meets at the direction of the Commandant on the call of the Fiscal Director.

The Budget Advisory Group is chaired by the Chief of Staff at Headquarters, Marine Corps, and it includes the top policy makers of the Marine Corps. Its membership is made up of the Deputy Chief of Staff (Plans), the Assistant Chiefs of Staff, G-1, G-3, and G-4, the Quartermaster General, the Director of Reserve, the Director of Personnel, the Director of Aviation, and the Director of the Administrative Division.

Policy, of course, is responsive to the need for guiding the Marine Corps toward a fulfillment of its national defense mission. The deliberations and the advice and recommendations of the Budget Advisory Group are founded upon their knowledge of the functional areas for which each of the members is responsible in his capacity as a principal staff officer. Policy is also strongly influenced by the need to use the guidelines projected into the future by the long-range, mid-range, and short-range planning cycles of the Department of Defense.

The long-range plan of the Marine Corps is prepared annually to support and reflect the joint strategic long-range estimate of the JCS as these are stated in their long-range plan for all the military services. Broad indications of the Marine Corps requirements and objectives for the four-year period beginning eight years in the future are outlined in its long-range plan. It is important to note that the long-range plan is based on requirements; that is, on what we will need in men, equipment, and facilities to be ready to fight wars as we visualize them eight years from now. No attempt is made to equate these requirements with money. These are pure military estimates of what is needed for the defense of the country.

From the long-range period, we move back to the mid-range period -- that three-year period beginning four years from now. Each year the Marine Corps constructs a mid-range plan which sets forth objectives and requirements together with the planned disposition and composition of Marine Corps forces for the entire mid-range period. This plan is also based on, and it supports, a similar JCS plan for the four military services.

Our program system relates the requirements and objectives of the plans to the annual Marine Corps budget. Under the program system, all major administrative activities are grouped into eight broad areas of effort. Examples of these broad areas are the Manpower Program, the Troop and Organization Program, and the Logistics Program. Each program is the province of a General Staff Officer whose responsibility it is to act as coordinator for those programs which fall within his staff purview. For example, the Assistant Chief of Staff, G-1, is the coordinator of a number of subprograms which form the Manpower Program. The Assistant Chief of Staff, G-3, coordinates the Troop and Organization Program, and the Logistics Program is coordinated by the Assistant Chief of Staff, G-4.

The program coordinators prepare detailed and mid-range program documents which are based on the requirements and objectives outlined in the long-range and mid-range plans. These documents show the requirements, objectives, and expected problem areas in the various programs for each year for the six years following the next fiscal year after a document is published. For example, a program document published in November, 1960 (FY 1961), will show the yearly requirements and objectives for fiscal years 1963, 1964, 1965, 1966, 1967, and 1968.

Although certain assumptions may be made relative to fund availability, it is important to note that these yearly levels of attainment are based primarily on requirements needed to accomplish the mission of the Marine Corps as it is stated in approved plans. Our budget request for a specific year is a translation into dollars of the requirements and objectives of our programs for that year. It expresses current requirements in the light of past accomplishments and future needs. It states in terms of dollars the annual increment of the programs to be accomplished during the fiscal year in the step-by-step attainment and support of objectives derived from the plans of the Joint Chiefs of Staff.

As far as Marines are concerned, the sole purpose of our system of financial management is to enable us to direct the flow of personal skills and materials into our programs in an orderly fashion. Our "production" is not geared to sales and revenues so we cannot measure the success of our financial plans except in terms of how well we mesh programs, men, and materials, controlling the input of personal skills and material so we can get the fullest productive use out of them. The organization we are evolving for the use of financial management is the catalyst we need to refine our planning, directing, and controlling functions so we can promote full productive use of the national resources given us to do our job.

KNOW YOUR OFFICERS

CAPTAIN W. W. CHILDRESS, U.S. COAST GUARD

Born: March 31, 1909, at Boston, Mass.

Education: Graduated from high school in 1927.

Prior Service: Served two years with U.S. Army, 1928-1930.

Coast Guard Career:

Academy: Graduated from Coast Guard Academy and commissioned an Ensign in May 1933.

Assignments: Early assignments include duty aboard Coast Guard Cutters MOJAVE and THETIS, Student Aviator at Naval Air Station, Pensacola, and Coast Guard Cutters CHELAN, SEBAGO and TAHOMA.

September 1941 assigned to Navy Supply Corps School at Bayonne, N.J.; in 1942 was Finance and Supply Officer, Fifth Coast Guard District, Norfolk; then assumed command of Patrol Frigate USS CORPUS CHRISTI January 1944, and served in the Pacific war zone until September 1945.

Was Personnel Officer in 12th CG District, San Francisco, Calif. from Sept. 1945 to April 1946; then assigned as Finance and Supply Officer, 1st CG District, Boston May 1945 to June 1949; then reassigned to CG Cutter DEXTER in the North Atlantic.

Was Chief, Supply Division, Coast Guard Headquarters, Washington, D.C. from June 1950 to September 1953. From September 1953 to July 1955 attended the Graduate School of Business Administration at Harvard University and received Masters Degree.

Served as Comptroller, 12th CG District Officer, San Francisco, California from 1955 to May 1957, then assigned as Commanding Officer of CG Cutter TANEY in the Pacific until August 1959.

Assumed his current duty as Comptroller at Coast Guard Headquarters, Washington, D. C. on August 29, 1959.

Medals: Received American Defense, American Theater, Asiatic-Pacific and Victory Medals for World War II, and Korean War and National Defense Service medals.

Family: Married to the former Norma S. Daboll of New London, Conn. They have three children.

ELECTRONIC DATA PROCESSING IN FEDERAL TAX ADMINISTRATION

Julian K. Williams, Internal Revenue Service

About the Author: Mr. Williams received his A.B. degree from Ohio State University in 1929. He is a Systems Development Officer in the Systems Development Division of the Planning and Research Office of the Internal Revenue Service. He was formerly an examiner for the Ohio State Department of Taxation. The views of the author are not necessarily those of the Internal Revenue Service.

Not so long ago there was a considerable amount of confusion about the techniques in the mechanization of office work. Machines of unique characteristics had come into use before there was a language to describe them or to classify them.

Electronic Data Processing

Looking back, we can now see that electronic computers emerged as data processors at the time when they were employed to rearrange data. Automation was a word coined to describe the automatic transfer of material in process. This term was quickly taken up to describe the rearrangement processes when the material was data.

Analog computers were then excluded from the classification of data processors. Also excluded were those digital computers which were designed expressly and exclusively for arithmetic operations on data which were in order. If some processes on the data were debarred by the characteristics of the systems design, then the general term, data processing, did not seem applicable to the electronic system.

Since electronic computers were used as data processors in office automation, the combination term, electronic data processing came into standard usage with standard meanings. Electronic data processing systems were complex aggregations of components capable of performing all processes on data; and it was generally understood that all parts were connected in such a way that the system was put into operation by one man, at one place with one start button.

Electronic data processing thus appears to be the highest level of office automatism presently before us, toward which all lesser forms of mechanization are being drawn.

The Source of the Data in Tax Administration

In critical analysis of the data processing problems of the Internal Revenue Service, there is the tendency to resort to comparisons and analogy. The problems are identical with the problems of other tax administrations. Outside this specialization, there are comparisons with problems of organizations in the world of business and finance. Data processing is found to be a major activity in insurance and banking.

The insurance company, the bank and the tax office must keep records straight. In so doing, data will be processed. In the past two decades, the growth of the data flow in these institutions is in proportion to the growth of their clientele. The growth of the data flow is out of proportion to the growth of the population. The economy is expanding and the velocity of the data in movement is keeping pace. If electronic data processors are required to keep the record straight, they must be employed.

The tax office has so much data to process that its problems escape direct comparison with the insurance company and the bank. The clientele of the tax office is inclusive. The tax office cannot avoid the processing of data for the portion of the clientele who fail to abide by the rules. Thus, there is a limitation on the similitude.

The data which must be processed to keep the Revenue system's record straight can be roughly classified in four parts. These parts are described in terms of documents, that is, the pieces of paper which contain the data: First, there are the documents flowing in; second, there are the documents flowing out; third, there are the documents flowing through; and fourth, there are the documents of internal generation and use. A more complete description of each of these four parts is required.

The documents flowing in consist of tax returns, information returns, responses to questionnaires and correspondence, and so forth. Most of this material comes by mail. Approximately 94 million tax returns and 259 million information returns are received each year. All of this paper comes to rest in the Internal Revenue offices.

The documents flowing out consist of tax bills, acknowledgment notices, questionnaires, adjustment reports and tax blanks. Approximately 20 million bills are mailed each year. This number includes the installment notices of estimated taxes due. It includes the billing for taxes currently due and taxes past due. This paper moves out of the Internal Revenue offices and generally comes back into the processes as the documents are turned around, in use, by the taxpayers.

The documents flowing through consist of checks, deposits and schedules of earnings reports. About 60 million checks and money orders are issued and sent in each year in payment of

taxes. About 10 million depositary receipts are validated each year by the Federal Reserve system. These documents are sent in with the tax returns in lieu of checks. About 25 million earnings reports are sent in each year by employers and self-employed earners. The data which these documents carry is registered in the tax files. The documents move into terminal processes outside the Revenue system.

The documents of internal generation and use consist of accounting registers, identification indices and reports of enforcement officers. The accounting registers, with subsidiary ledgers and schedules, support the entries to the general ledgers from which the operating statements are drawn. The identification index is the list by which accounts are identified and taxpayers are enrolled. The reports of revenue agents are the basis for the correction of the assessments. The reports of revenue officers are the recitations of the activities in the collection of delinquent accounts. All of these papers proceed through the processes and remain in the Revenue system, at the points of principal use.

In all categories, there are in excess of a half billion documents bearing many billions of data characters into the Revenue Service processes each year.

Now, these documents are not necessarily efficient carriers of data. In the first place, every document class which has been described is a form composed of paper. These papers are of a size that is prehensible; the data registration is of a size that is legible; the format of the document makes the data registration intelligible. The documents are designed for human data-processing. In the second place, most of these documents are forms of communications outside the Revenue system. For every place in which there is a space provided for data registration; there is a large area provided for instruction by definition of what the data are. Furthermore, the format of a worksheet is incorporated in the body of tax forms. Columns, lines, decimal points, check boxes, provisions for expression of the algebraic sign of differences, and so forth, represent requirements of format that are wasteful of paper.

The data that are registered on the document are composed of identification material (constant) and numbers with monetary significance (variable). That data which are identification material may be repeated on numerous documents related to the tax entity which is identified -- for example, the account number of an individual may be found on tax returns, information returns, registers, checks, mailing lists, indexing registers, and the like. Also, the name and address of a payor of common stock dividends may be found on every one of several million information returns. These identifications are constant and unchanging but they represent data from documents, and without this data the variable monetary information would be worthless.

The documents which are filed away in the Revenue system are located in the district offices. During the course of data processing, they may be located at other places, such as service centers, local offices, or the national office. The document file is erected, maintained and controlled at the district office. Aged documents are moved out to Federal records centers for intervening storage, and to ultimate destruction when the statutory time for retention runs out.

Electronic data processes are not expected to result in any immediate simplification, elimination or reduction of the content of documents flowing in, flowing out, or flowing through the system. However, these things may happen sooner than is expected, particularly for the documents of internal generation and use. It depends on the usage to which the electronic systems are put.

Electronic data processors will have use in processing the data from the documents in order that the documents may sooner be laid down in their final resting place in the files. When the data from the documents are entered into the system in a modus mechanical, then the items that are alike can be brought together and the unlike can be held apart. The purpose of the document is to carry the data through the mails and between people. The purpose of the processor is to carry the data through the processes.

That part of electronic processing which represents the bringing of like things together is the part which is of chief interest to the tax office. The high speed of arithmetic operations is only an incidental added attraction. As presently constituted, the computations are not particularly long, involved or complex.

The most involved taxation computations are in the cases of individuals with net long-term gain who figure the alternative tax, the carry-back and carry-forward of net operating losses and the portion of annuity payments received as computed to be included in income for a taxable year. None of these computations require a knowledge of mathematics other than arithmetic. None of these computations are beyond the capacity of the taxpayers who need to make them.

Internal operation in statistical compilations requiring involved computations are in the weightings and imputations that give validity to the results that are based on sample data. Consistency testing and the interrelation of factors necessary for the improvement of the selections for audit classifications, also represent lengthy usages that occupy the equipment for long periods.

The point is: The collection and association of data are the primary requirements. Electronic data processors with the greatest abilities of data assembly are needed. To sort, compare,

interfile and select are the essential processes. In truth, the tax computations necessary, simple though they may be, cannot begin until the non-arithmetic processes are completed.

Behind these estimations of the requirements are the goals which are sought constantly to be attained. These are: the increase in taxpayer compliance, the increase in the service rendered to the participants and, as a consequence, the increase in the yield of revenue from the taxes as they presently exist. The electronic data processor is a tool for the attainment of the goals.

The sources of the data in tax administration have been tallied to indicate the present need for electronic systems. New sources may increase the data volume. Before contemplating problems occasioned by new data sources, it is incumbent upon the Revenue Service to examine the utilization of the data that is with us presently.

The Accommodation of Electronic Data Processors to the System

To increase taxpayer compliance has been stated as an objective of the systems change. Now, it is a plain fact that some taxpayers report imperfectly, others not at all. To the first class we ascribe error; to the second, delinquency. To increase taxpayer compliance is to reduce the number of taxpayers who fail in either respect and, consequently, to spread the burden of taxation with equity.

Consider the simplest situations of the larger numbers, the cases of individuals. Devices of accounting control through information returns have been a part of the system for years: Employers provide Form W-2, which sets forth wages to be reported; transfer agents provide Form 1099, which sets forth dividends, interest or other payments to be reported; partnerships provide Form 1065, which sets forth distributive shares of income to be reported.

The fullest use of these devices is to validate the completeness of the entries in the reports of the individuals described in the information, or to discover that a report was made when the information indicated that it was due.

The data processing operations that ensue upon the receipt of these information documents are predicated upon the premise that the document can be taken to the place where the report should be. In most cases, this can be done, and, when it is done, the perfection of the entry is certified. The flaw in the premise is that the report may be in any one of a number of places, and properly so. To the extent that these information documents cannot be associated, the usage of the device is defeated.

Before this operation is closed out, it is worthwhile to note that not all reporting deficiencies can be charged against the individual. In some instances, the individual reports a kind of income that should have been matched with an information report. In these cases, it is the information reporting which is defective.

Needless to say, under present circumstances, the data processing is truly document processing. In other words, the data moves as the document moves.

Electronic instruments will be no more successful in these operations unless the characteristics of the files are changed. It is not the tax report which must be found, it is the data from it. This data from the tax report must be taken up from the document, consolidated and then ordered into a single place. The data from the report must be retained in a condition and an order which will keep it accessible to electronic reference. The data from the information must be ordered similarly.

In this electronic data processing operation, it is possible to take action when the information in the two files does not agree. Like items can be assembled, then summarized. Tax potentials can be calculated. Communications with the individuals, the information reporters, and the revenue officers can be effectively made. Error and delinquency can be corrected.

When the data from the tax report is taken from the document and ordered into a single place, there will be constituted the first of the prime tax files. The prime file is the file which contains all of the associable data for the taxable entity in one place. When there is only one place for the data, only one reference is needed to locate it. No such prime files for any taxable entities are maintained in the Revenue system presently. The fondest hope is that electronic data processors can be used to create and preserve such a prime file.

In keeping the record straight, the Revenue Service is required to confirm the prepayment credits used in settlement of the individual's annual tax. Omitted from this consideration are the dividends received credit and retirement income credits, for these are tax reduction factors. Also omitted are income tax payments to a foreign country, income tax paid-at-source on tax-free covenant bond interest, and credits for partially tax-exempt interest. Included are the four types of credits which have the characteristic of deferment from payment time to application time. These are: (1) credits for amounts withheld from wages, (2) credits for the overpayment of F.I.C.A. taxes in multiple employment situations, (3) credits for overpayment of one tax year carried into the settlement of the succeeding year, (4) credits for payments made in estimated tax accounts.

Prepayment credits represent about $30 billion of the annual revenue settlement. These are the principal modes of current payment, that is, payment of tax concurrent with income realization. It is the obligation of tax administration

to account for these credits with precision and care, as would be the case if they were payments made at tax-settlement time. Requirements of data processing are predetermined by obligation.

Lacking prime files for taxpayers, the confirmation of the credits is hampered and restricted. The burden of associating credit documents with tax reports is increased by the absence of matching order in the files of tax reports. This was seen in the problems of matching information reporting of income.

There is an interesting aspect in the matter of deferred credits that need special explanation. The number of taxpayers who fail to claim credits exceeds the number of taxpayers who claim credits excessively. The net effect of the correction is to substantially offset the take-in by the pay-out. The obligation of the Service is clear. The credits are to be confirmed; faults are to be rectified. The earnest desire is that electronic data processors can be used to fulfill the obligation.

The usefulness of a prime file for tax base data and credit data is apparent. Other usages come immediately into view. This is for the reason that the data for given tax period can be combined with the data for another period. This is the concept of a file of permanent registration which is the prime file of continuity.

No prime files of continuity are in the Revenue system at the present time. Lists of taxpayers are maintained. These lists are located in the principal office of the Internal Revenue District in which the taxpayer is located. Separate listing are maintained for the separated assessments, for the taxes, for the periods and for the entities.

Through the use of these lists, it is possible to assemble all of the documents containing data related to the tax history of an individual. This is a costly process and is not routine. It is undertaken in the special cases of incipient fraud.

Prime files of continuity, in form accessible to electronic processing, will have three uses which will serve to increase compliance: First, the repetition of the constant data; second, the disclosure of deviations in the variable data; third, the carry-over of the change determinations.

From a prime file of continuity, there can be extracted the materials which have constancy. Names, addresses, exemptions, marital status, occupation, age, and the like, are constants of identification that need repeating in many places at many times.

From a prime file that contains a series of variables, there can be taken the deviations which are suspect. Income, deductions, credits, and the like, are variable, but they have a pattern of constancy which make absurd deviations detectable.

From a prime file of continuity, there would be extracted the cases of inclusions and disallowances of changes by audit examination. These changes could then be made available to compare with subsequently filed returns to assure that previously corrected errors are not being repeated.

Thus, there are two principal usages of electronic data processors in the attainment of the objective of the increase in taxpayer compliance: The assembly of a prime file is necessary to effect accounting controls; the maintenance of prime files of continuity is necessary to effect consistency controls.

These files are not proposed to be collections of paper documents. The paper documents will be held at the point of data entry into the systems. They will be arranged in the order of entry. It is the like data which will be brought together in the form of recordings on magnetic tape. Electronic data processing thus requires systems capable of performing all processes on the data.

In addition to the general benefit to all taxpayers derived from a higher degree of compliance on the part of a few delinquents, there should be an enlargement of service to the taxpayers, arising from the introduction of automatic data processing systems. The areas in which the data processing service can be extended are in the compilation and classification of tax base data, the interpretation of the rules of taxation, and the computations necessary to the application of the rates.

Specifically, the compilations and classifications which have taxation continuance can be carried over. Historical information in connection with the basis for depreciation of capital assets, taxable income from annuity contracts and losses from operating or capital asset transactions, once recited and validated, could be made useful to the taxpayer in his compilations and classifications for the forward periods.

Specifically, the interpretations of the taxability of the classifications -- made by statute or ruling, and applied -- could be entered into data files for subsequent use on behalf of the taxpayer. History has a way of repeating itself, electronically.

Specifically, the computations of the income and the tax can be increasingly taken over by the systems. For example, in Schedule K, Credit for Retirement Income, Form 1040, can be seen an outstanding example of the computational work sheet. There are presented 23 boxes for the entry of money values as reports. In extreme situations, 21 of the 23 boxes would be required to contain an entry. Only six of these 21 boxes could contain base factors. The other boxes are used to record intermediate answers, that is, sums, remainders, products, limiting constants, and so forth. All of these intermediate entries could be generated and used, in an instant, and disappear within the interior of an electronic robot.

Will the taxpayer-person be benefited by this change in mode of service? Should he be educated to the compilations, classifications, interpretations and computations, or should the work be done for him? Is such education necessary to appraise the taxpayer of the social impact of the statute? These questions cannot be answered without equivocation. It is inevitable that changes in the modes of service will come about, for the obvious reason that the increasing complexities of the culture will require it.

Other Possibilities

There are other possibilities in electronic data processing operations. The first consideration is for the fundamental operations in tax administration, and the pressing needs for the solutions of the present problems.

Many possibilities for data processing lie in the sphere of action, which is more mundane. The field of excise taxation, whether involved with reports or stamps or licenses, contains a universe of data needing assembly, comparison, selection and calculation by the most expeditious devices. Permissive control operations in the administration of the tax on alcoholic beverages involves data reporting and gathering on a grand scale. The registry and control of the transfer of certain firearms sets up the requirement for a huge file of data which must be serviced.

Of immediate interest are the possibilities of statistical reporting that can be undertaken when pertinent data of several tax years lies together in the file. This reporting would be above and beyond that which is required by present law. Such reporting would be of value to tax legislative counsels and to administrators.

It is possible to comprehend the construction and potential use of a concordance of the Internal Revenue Code. Such a compilation has been made for the Revised Standard Version of the Bible. This was a demonstration of an existing problem of index and the solution by use of electronic data processing.

Internal reporting on the effect of operations, in an elaborate and expeditious form, would be possible. Management information reporting is everywhere intensified upon the introduction of electronic data-processing systems. Operations research studies involving lengthy and tedious calculations can be undertaken when machines with ravenous appetities for numbers are at hand.

Possible improvements to the internal audit exist in the use of electronic data processors. The course of the tests can be changed and the certification, to management, of the completeness and correctness of the internal data files can be made more explicit.

The Main Purpose

No radical departures from present means of tax administration are predicted here. Electronic data processors will bring about change, but this change is a measurable projection of the purposes already established.

It would be unwise to make grandiose forecasts of simplifications, eliminations or economies. To do so would be to misstate the desirabilities. There is enough of justification for the engagement of data processors, in present circumstances, in the accomplishment of the main purposes.

Herein is an attempt to establish the inescapable conclusion that the Federal tax administration will require the use of the most powerful data processors. The main purposes will be to increase compliance, to enlarge the services and, as a consequence, to increase the revenue yield. If these purposes can be served, coincidentally with other benefits, so much the better.

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EXPENDITURE MANAGEMENT IN THE DEPARTMENT OF THE ARMY

H. T. LaCrosse, Deputy Director of Army Budget

For everything in days of old,
The Greeks had a word so I've been told,
For Budgeting it's fairly sure,
The word would be "Expenditure."

Expenditure management per se in the Department of the Army had its genesis in December 1951 when the President of the United States directed the Department of Defense to plan its program in such a way that expenditures for Fiscal Year 1953, including funds spent on Military Assistance, would be less than $60 billion.

In a January 1952 memorandum for the Assistant Secretary of the Army (General Management), the Secretary of the Army, Frank Pace, Jr., stated that "the presently contemplated Fiscal Year 1953 budget limitations of $14.2 billion on Obligational Authority and $19.0 billion on Expenditure Authority will, if adopted, create fiscal problems requiring ingenious planning and skillful execution if the Army is to accomplish its program of logistical preparation."

Time has eliminated from the scene many of the players, a few of the exigencies, and certainly all of the dollars involved in the events which prompted the present system of expenditure management. The ingenious planning and skillful execution so aptly expressed by the former Secretary of the Army is, however, still very much an imperative to the successful management of expenditures in the Department of the Army.

In early 1952 the Department of the Army Staff was faced with the immediate requirement to develop the necessary machinery for the successful accomplishment of its mission within the framework of the newly imposed expenditure objectives. Two basic questions to be answered were:

1. Who and what is involved in the management of expenditures?
2. What types of actions at what level of authority can be taken to effectively manage expenditures?

It is the purpose of this article to outline briefly the reasons for the expanded role of expenditures, present a short history of DA experience with expenditure management, and highlight a few aspects of the management processes.

United States Government expenditures delineated as monthly and cumulative expenditures for the current and preceding fiscal year appear in the Monthly Statement of the United States Treasury published on the 15th of each month. Insofar as the National Budget is concerned, expenditures represent net charges to all appropriations authorized by the Congress. In the Department of the Army the term "net expenditures" represents the net charges to Army Appropriations. The Department of the Army performs services for and sells goods to other government agencies and authorized individuals. Collections derived from these sources serve to reduce charges against Army appropriations. Other funds received for certain specific transactions are credited to Miscellaneous Receipts of the Treasury and do not affect Army expenditures.

Thus, it can be seen that the management of expenditures within the Department of the Army encompasses not only the management of gross payments, but also the management of collections resulting from the sale of goods and services.

Increased Emphasis on Expenditures

The National or "Executive" budget system in the United States had its beginning with the enactment of the Budget and Accounting Act of 1921. Referring to this Act, President Harding in his first budget message stated that this was ". . . the greatest reformation in governmental practices since the beginning of the Republic." The comparatively late development of a national budget system can be partially attributed to the relatively minor role federal finances had played in the economy of the United States prior to 1921. Since 1921, however, the growth in sophistication of federal budgeting has clearly paralleled the rising national influence of the budget itself.

It is against this background of the expansion of the role of the Federal Government in the economy of the United States that we must review the evolution of the present status of "expenditure management." And it is against the prospect of continued increasing emphasis on expenditure management that we must constantly analyze and evaluate the present system of programming and budgeting in the Department of the Army.

The increased emphasis on expenditures is not limited to activities of the Department of Defense, rather the emphasis runs the gamut of public finance and has its "Tap Root" in the decades of the 30's and 40's when the pattern of Federal finances was one of expenditures exceeding revenues. This pattern of deficit financing in turn was the result of two significant historical periods--the great depression of the 30's and World War II. A concomitance of the deficit financing of these two periods was the inevitable increase in the size and economic influence of the Public Debt.

In Fiscal Year 1930 the Federal Government realized a surplus of revenues over expenditures of $738 million. In each subsequent year until 1947 expenditures exceeded revenues reaching a maximum deficit in 1943 of $57.4 billion. In 1947, 1948 and 1951 surpluses of $.8 billion, $8.4 billion, and $3.5 billion respectively were realized. Thus, for a period of 22 fiscal years prior to 1952 surpluses were obtained in only 4 fiscal years and the national debt had risen from $16.2 billion to $255.2 billion.

It is not intended here to discuss the traditional economic pros and cons of the problems associated with management of the national debt. It is merely desired to show that the United States Government today is the biggest business on earth, that the national debt has assumed proportions many times larger than once foretold the "end of the world" for some people, and that the role of Federal finance in the economy of the United States has reached a point where successful fiscal and monetary policy is not just in the category of "nice to have" but is vitally necessary.

It was in the context of this background and the prospects of deficits in fiscal years 1952 and 1953 that the President of the United States directed the Department of Defense to plan its program in such a way that expenditures for Fiscal Year 1953 would be less than $60 billion; thus, the Department of Defense, for the first time in history, not only had to manage its obligational program but also had to manage payments, or expenditures, for goods and services received.

Brief History of Expenditure Management in the Department of the Army

At no time has the Bureau of the Budget imposed upon the Department of Defense a legal expenditure ceiling. Expenditure guidance from the Bureau to the Defense Department has been in the form of an expenditure plan and no penalty for exceeding or failing to meet the plan has ever been prescribed.

The legal aspects of the administrative control of appropriations are covered by the Revised Statutes, Section 3679, which states that "No Officer or employee of the United States shall make or authorize an expenditure from or create or authorize an obligation under any appropriation or fund in excess of the amount available therein. . ." Penalties are prescribed for violations. This means simply that Department of Army will not obligate or expend beyond fund availability; however, the magnitude of expenditures in any fiscal year prior to Fiscal Year 1953 was not "managed" but rather followed obligations as a matter of administration, i,e., as vouchers were processed for payment. Since Fiscal Year 1953, operating under Bureau of the Budget and Department of Defense expenditure "Plans" or "Targets" or "Objectives," call them what you will, Department of the Army has programmed and budgeted its obligational requirements to "fit" the expenditure objectives received from the Office, Secretary of Defense.

On 19 January 1952, the Secretary of the Army instructed the Assistant Secretary of the Army (General Management) to assume direction and supervision over the preparation and establishment of the necessary plans, procedures, and controls which would be required in connection with expenditure limitations established by the Secretary of Defense. One month later, on 18 February, the Budget Advisory Committee (BAC), chairmaned by the Army Budget Officer, now Director of Army Budget, assumed responsibility for directing the control of Army expenditures. Army Regulations 15-35 assigns as one of the functions of the BAC, "Reviewing and making recommendations on new programs and policies and/or revisions therein which necessitate substantial change in the contemplated expenditure of current year funds."

Concurrently, the Comptroller of the Army was assigned the responsibility for exercising staff supervision over the development and operation of the system for control of expenditures. A working group was established for the express purpose of developing a system for the establishment and operation of expenditure controls. This working group consisted of representatives of the Office, Comptroller of the Army, the Assistant Chief of Staff, G-4, and the Office, Chief of Finance. At the same time a Permanent Expenditure Control organization--the Expenditure Control Branch--was established in the Budget Division of the Office, Comptroller of the Army. Today, the Expenditure Control Branch is part of the Fiscal Analysis Division, Office, Director of Army Budget. The TD is substantially the same, and the modus operandi is basically unchanged from the early days of its organization, which is a tribute to the foresight and careful planning of the original "expenditure entrepreneurs."

Since Fiscal Year 1957 expenditure guidance received from the Office, Secretary of Defense has played an increasingly significant role in planning the Army's obligational programs. In instances where increases in expenditures beyond the direct control of the Army have occurred, it has been necessary to curtail or defer planned obligational programs in order to absorb such increases within assigned expenditure objectives.

A Few Highlights

In order to place expenditure management in the Department of the Army in its proper perspective, it is further emphasized that there exists within the Office, Comptroller of the Army a focal point of responsibility for all aspects of expenditure management. The Organization and Functions Manual of the Office, Comptroller of

the Army details as one of the assigned functions of the Fiscal Analysis Division, Office, Director of Army Budget, "Acts as the office of primary responsibility for providing expenditure forecasts, analyses, evaluation, and control."

Thus, the Office, Comptroller of the Army acts as the office of primary responsibility within DA for expenditure management. Other Deputy Chiefs of Staff (Program Directors) are responsible for expenditure management within their assigned areas in accordance with the concepts of integrated programming and budgeting. Comptroller of the Army representatives work very closely with the program directors in developing within total DA expenditure objectives the individual appropriation objectives. These appropriation objectives then become in effect "Gentleman's Agreement," and become goals toward which management effort is directed. As the fiscal year progresses, adjustments in the appropriation annual expenditure objectives are generally made on the basis of informal staff coordination where such adjustments do not require revisions in the appropriation obligational program. In cases where expenditure considerations necessitate downward revisions in obligational programs the matter is referred to the Program Advisory Committee for resolution.

The Comptroller of the Army also transmits its appropriation estimates to the Office, Secretary of Defense who, in turn, submits estimates for all services to the Bureau of the Budget. These estimates are phased on a monthly basis and include estimates of obligations, gross disbursements, collections, and net expenditures, for each appropriation for the fiscal year. Supporting schedules are submitted with the estimates identifying the source of the collections applicable to the reimbursable obligational program.

The Office, Assistant Secretary of Defense (Comptroller) uses the estimates as submitted by the services, together with actual expenditure and collection data reported as the fiscal year progresses, as a basis for monthly briefings at the Armed Forces Policy Council (AFPC) meetings. The Armed Forces Policy Council is composed of the Secretary and Deputy Secretary of Defense, the Chairman of the Joint Chiefs of Staff, the Director of Defense Research and Engineering, the Secretaries and Chiefs of Staff of the Army and Air Force, the Secretary and Chief of Naval Operations of the Navy, and the Commandant of the U.S. Marine Corps. In the Department of the Army, the Director of Army Budget briefs the Secretary of the Army and the Chief of Staff on the current status of expenditures prior to the meeting of the Armed Forces Policy Council.

The following brief chronology is presented in order to highlight Department of the Army experience with expenditure objectives in Fiscal Year 1959:

7 August 1957. The Secretary of Defense directed that the Army develop and submit its budget programs for Fiscal Year 1959 for initial review by the Office, Secretary of Defense, within an expenditure limitation of $8.6 billion.

24 October 1957. The Army submitted to the Office, Secretary of Defense a basic budget within the expenditure guidelines of $8.6 billion.

14 November 1957. In accordance with instructions, a second budget estimate was submitted to the Office, Secretary of Defense which included an addendum and contained a total expenditure estimate of $9.17 billion. The $9.17 billion estimate was based on an end strength of 900,000 for the active army and 700,000 for the reserve components. Increases were in the O&MA appropriation commensurate with the increased strength and the MCA and PEMA appropriations.

January 1958. The President's Fiscal Year 1959 Budget contained an expenditure estimate for the Army of $8.88 billion. The Budget as submitted by the President provided for a military strength of the active army of 870,000 and reserve components strength of 630,000.

August 1958. The Office, Secretary of Defense approved a new Fiscal Year 1959 expenditure objective of $9.163 billion providing for an active army strength of 870,000 and a reserve components strength of 700,000.

September 1958. Based on Army estimates of expenditure requirements within the obligational authority provided by the Congress, the Army requested an increase in its expenditure objective to $9.242 billion. This estimate was based on an active army strength of 900,000 and a reserve components strength of 700,000. This request was not approved by the Office, Secretary of Defense and a new objective of $9.165 billion was approved.

April 1959. Based on cumulative experience in Fiscal Year 1959 the Office, Secretary of Defense approved a new expenditure objective for the Army of $9.371 billion.

30 June 1959. Largely because of more rapid liquidation of obligations in the PEMA appropriation than had been anticipated, actual expenditures for Fiscal Year 1959 amounted to $9.468 billion.

The magnitude of expenditures for any given fiscal year is not, of course, directly related to the new obligational authority provided in the Appropriation Acts by the Congress for that year. For example, at the end of Fiscal Year 1953 the United States Government had a total of 79 billion dollars of unexpended balances--unobligated and obligated but not paid--to be carried forward to Fiscal Year 1954. For Fiscal Year 1954 expenditures were estimated to be $78.6 billion, of which $37.5 billion would be against unexpended balances and $41.1 billion against new obligational authority.

At the end of Fiscal Year 1954, due in large part to the appropriations required to finance

the Korean action, the Army had on its books sizeable unexpended balances. Because of this, the Army was able to finance its procurement and production requirements for the years immediately following the Korean action with relatively reduced new obligational authority. In Fiscal Years 1955, 1956 and 1957 no new obligational authority was requested for the Procurement and Production appropriation (now PEMA).

In addition, $822 million of the P&P balances were transferred to other appropriations, including $255 million to the Air Force Construction account, and a total of $500 million was rescinded.

In effect, then, the Army operates under dual financial controls (1) new obligational authority provided by the Congress and (2) expenditure objectives established by the Office, Secretary of Defense. And the twain must meet if the Army is to make full use of all funds appropriated.

An example will clarify the limits of flexibility afforded the Army in its financial planning; approximate figures will be used. For any given fiscal year with an expenditure objective of $10 billion, $9 billion will be in a category which can be realistically called inflexible, i.e., required for programs which are established by Congress, such as the size and pay of the Army, or required for payment of prior year obligations as in the case of long lead time procurement contracts in the PEMA appropriation. Less than $1 billion or approximately 10% will be available for new programs in that fiscal year. Any new programs must, of course, result in current years' expenditures within this "flexible 10% area," or increases in the expenditure objective must be approved by the Office, Secretary of Defense.

In Fiscal Year 1960, Congress expressed its desires in connection with the Army's requirements by adding to the President's Budget approximately $350 million in new obligational authority for modernization of the Army and increased strength of the Army Reserve Forces. Expenditure considerations, the flexible 10% mentioned above, precluded the use of most of the "add-ons" for modernization, since $175 million of the additional NOA was reserved for use in Fiscal Year 1961.

For the future, it is clear that the Department of the Army must plan and manage its financial resources, both new obligational authority and expenditures to insure maximum balance in the performance of its mission in support of the national defense.

DON'T FAIL

TO SEND IN

ANY CHANGE OF ADDRESS

ECONOMIC AND MANAGEMENT CONSIDERATICNS IN NATIONAL DEFENSE

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Introduction

Providing for the national security of the United States is extremely expensive. From 1955 to the present, national security expenditures have averaged more than 10 per cent of our gross national product compared to a little over 1 per cent during the decade of the thirties. Due to the increasing cost and complexity of weapon systems, it now appears that the costs of defense will continue to increase at the rate of one billion dollars annually into the foreseeable future.

The enemy engages us in a conflict that assumes many forms. The field of military security is only one of these areas and our resources must be devoted to meeting his counter-efforts whether they be purely military or whether they be economic or political in nature. The total effort which we are economically willing and able to make is limited. Therefore, we are always confronted with the necessity of allocating our scarce resources among many competing ends such as the military budget, space exploration, atomic energy, mutual assistance programs, economic assistance and numerous others. Within the military budget, our dollars have to be divided among many types of forces and many kinds of weapon systems because the time, place and kind of warfare will be determined by our adversary and not by us since we will not initiate armed aggression.

Enemy Capabilities

The fact that the initiative is alwys with our antagonist adds greatly to the problem of national defense. It also increases the cost of security and results in a great deal of waste because plans must be frequently revised and preparations must be made for a number of contingencies which may never arise.

The rapid growth of science and industry in the Soviet and the ability of their policy makers to allocate their best human and material resources to increase their military effort has resulted in the development of weapons systems probably equal to or better than our own. The numerous courses of action available to him, be they military, economic, political or a composite of these, forces us to make our choice among any number of competing alternatives. These decisions are extremely difficult and the opportunities for error are apt to be frequent. If errors occur, they are likely to be irreversible and may be disastrous to our national security.

Military Effectiveness

To deter or to meet the attacks of the enemy, only those capabilities in being for retaliation and restoring the society have any meaning. A huge economic potential for war, our greatest asset in past conflicts, is no longer a protection because it can be virtually obliterated in a matter of hours. Neither can we buy time through the efforts of our allies as we have in previous wars. Therefore, to maintain military effectiveness at the highest possible point, we must stretch the taxpayer's dollar as far as it will stretch in every possible direction. For every dollar of input, we must obtain as close to a dollar's worth of output in the form of national security as is humanly possible of achievement.

The search for greater efficiency must be concerned with specific improvements and must seek to eliminate deep-seated causes of inefficiency. Among the obstacles to increased efficiency are the ingrained distrust of military leaders to civilian economizers; certain interservice rivalries; political realities arising outside the military services; the difficulty outsiders, as well as policy makers, encounter in recognizing disadvantages as well as advantages of proposed reforms; the extent to which military management relies upon people trained as tacticians rather than an administrators, an impediment which is compounded by the traditional rotation policies; and the difficulty of adapting concepts of efficiency appropriate for business management to the much more different and complex problems of maximizing the national security.

In addition, our inability to develop and bring to fruition a coherent long range—intermediate range—short range series of plans reduces our operational readiness and decreases our combat capability. Not only are we deficient in our military planning—we are also far from being as effective as is necessary in streamlining our administrative processes to the point that support elements are contributing dollar for dollar in terms of supply and services.

Economic Limits

The amount we should devote to defense is for the citizenry to decide. In this respect, the less we spend on national security the more difficult our choices become, the more we must rely on our frail capacity to foresee the future, and the fewer are the contingencies against which we can protect ourselves adequately. From this point of view, we can afford to pay for national defense what we feel we must afford. In other words, there is no economic basis for the notion that we are within reach of or ex-

ceeding some breaking point beyond which tax-financed expenditures will critically impair our economic growth. The military budget, from this standpoint, can reach a size representing 15 percent of the gross national product or even more.

National Security and Economic Growth

Every important proposition about the relationship between security expenditures and national economic policy must be couched in terms of probabilities and risks. No one can state positively that the difference between a $1 billion dollar surplus and a $1 billion deficit is the difference between economic stability and economic stagnation. No one can honestly argue that $43 billion of military expenditures means security whereas $41 billion means insecurity. All that can be done is to judge the probable relationships between certain policies and specified dangers and opportunities and to decide which dangers are most to be avoided and which opportunities are most to be sought.

Into the foreseeable future, the American society will be confronted by three real and trying tests revolving around these dangers and opportunities:

1. Do we have the determination to do the things which will keep our defenses strong for an indefinite period of watching and waiting warfare?
2. Are we prepared to play our part in every possible conceivable and workable way, to promote and protect freedom throughout the world?
3. Do we have the will to control inflation while seeking the highest sustainable economic growth?

The Role of Inflation

It may seem odd to classify inflation as one of the great dangers of our time. Although we have survived inflation in the past, never before has it been the threat that it is today. First, there is the widespread impression, realistically based on public policy, that the price level will never go down again. Every little increase leads to the anticipation of even more inflation rather than the opposite. Second, there is an increasing tendency to look to government to solve problems by the use of direct controls. Combined, these factors create the danger that inflation will get out of hand to the point at which the Government may have to attempt to end it by direct intervention. Although this approach might not be effective in halting inflation, it would represent a fundamental and disastrous departure from the traditional concept of a free American economy.

Tax Considerations

In order to balance economic stability and economic growth, Federal expenditures must be carefully managed. When private demand is high and rising and therefore threaten to exceed the nation's capacity to produce, the end of Federal fiscal policy should be a budgetary surplus - the Government should collect more in taxes than it expends. Similarly, the Fundamental reason for a Federal Deficit - expenditures greater than tax collections - is to sustain demand and to promote recovery when indicated. This means that over the course of say a three to five year business cycle, the Federal budget should be balanced although any given year would generate a surplus or a deficit depending on the state of the economy.

A cyclically balanced budget, rather than continuing Federal deficits, bears a close relationship to the expenditures for national security. An increasing Government debt, of the kind created by continuing deficts, would place the burden of repayment on future generations, who, in the nature of the situation, must also pay for their own expenses of national defense. Furthermore, continuing Government deficits accelerate the inflationary trend--thus pyramiding the costs of operation and weakening our overall economic potential.

National security expenditures today, as well as during the foreseeable future, will account for about 60 percent of the total federal tax burden. Unlike most government expenditures such expenditures absorb a large share of the current output of the Nation without, except in limited respects, providing goods and services which improve consumer welfare or add to the country's stock of capital goods. A tax load, considerably greater than that presently in effect, may harm the productive growth of the ecomony if it discourages work effort, enterprise, investment, and the capacity as well as the incentive to save.

Considerations of military effectiveness cannot and most not be divorced from th fact the military budget consists of resources which are limited in amount. Optimum military effectiveness can therefore be achieved only if all existing techniques for improved management are employed at every level in our military services. As the gross national product grows in size, more resources will be available but, as indicated earlier, the continuously rising cost of weapons systems is so great that it will account for an increasing share of the total military budget. To put it differently, this means that increased efficiency and austerity must be practiced in all other areas of military operations if we are to improve our capabilities over time. To accomplish this will also require a greater reservior of trained management leadership than is currently available in the Department of Defense.

Materiel Management

Logistical effectiveness cannot be divorced from the overall impact of national security costs on the national economy. In the traditional concept of warfare, the basic considerations of supply were to have the right materiel in the right place at the right time. Considerations of cost, in terms of a one shot mobilization of the economy, were frequently secondary to achieving a balanced output which would result in the greatest possible capability within the shortest possible time.

Modern warfare differs from the traditional concept of combat from which much of our military supply doctrine still receives its basic orientation. In previous wars, materiel was centrally procured and distributed on a free issue basis. Military managers were trained as tacticians and distribution logistics was considered to be a secondary function. Similarly, the business aspects of production logistics were treated as incidental to the primary task of closing with the enemy and defeating his forces.

The cold way we are engaged in today differs in many fundamental respects from the hot wars of the recent past. Producer logistics - the determination of requirements, the direction of acquisition, and distribution of materiel - is receiving a professional status in the military service. Consumer logistics - the distribution of materiel to tactical units and consumers - is acquiring a similar recognition.

Long-Run Considerations

Cold war is a long pull concept. The strength of the economy must be maintained by not burdening it with unnecessary demands for materiel. Military resources must be carefully managed in order to maintain the economic base on which our defense effort must ultimately rest. The optimum military capability is achievable only if all resources are well managed because each dollar of waste subtracts that amount from a stronger military posture. Materiel management, under this approach, must constantly be evaluated in terms of its impact on the highest total physical and financial availability of resources.

Today, and over the foreseeable future, the defense of the nation cannot be considered as a one-shot affair. Rather, the needs of the cold war call for a going concern approach to materiel management. Like any commercial business, military logisticians must plan and control their operations over an extended period of time. Supply economy is no longer limited only to the determination, acquisition and distribution of physical assets as was the case in the traditional concept of logistics.

Because the supply operations which support watching and waiting warfare require such huge and complex amounts of materiel, and because the task is too large to be administered from one central office, supply operations must be decentralized as much as possible. Management of decentralized materiel operations requires measures of performance which indicate the extent to which standards or goals have been achieved. The means through which such measures of effectiveness and efficiency in supply can be achieved is through the use of the control mechanism. A workable control mechanism, which measures the effectiveness of resource allocation, requires a standard denominator and that denominator is obtained by a common language which translates item data into dollar data through a materiel pricing system.

Materiel Pricing and Financial Accounting

Just as materiel pricing provides the common language and the common denominator, financial accounting provides the system of framework which measures resource requirements, allocation and utilization. This concept is wider than financial inventory accounting or similar devices because a satisfactory accounting system must be designed so as to provide factual information on existing assets as well as data on requirements for approved programs for which assets must be furnished at scheduled future dates.

Reliable accounting information is one thing; good supply management is another—but both must work together. Neither alone can bring about the optimum allocation of scarce resources. Thus monetary supply and requirements data are not of much value if supply personnel do not use them to improve the management of materiel in the military services. By the same token, supply managers cannot do an effective and economical job over the long run if they do not have timely and valid quantitative requirements and inventory data on which to base their decisions.

Basic Aspects of Materiel Management

Like any organized activity, materiel management, viewed from an overall point of view, can be divided into the three basic functions of policy formation, operations, and control. Policy consists of the goals of and objectives of materiel management—the right materiel in the right places at the right time at an economic cost. To the extent that these goals are attained, supply effectiveness is improved and the capability of the combat forces is increased. If these goals are not attained, combat capability is reduced and the national security is thereby endangered.

Policy Formation

It is not expected that those levels of the

supply management organization concerned with policy formation will operate the supply system. Their basic function is the development of supply policies, objectives and programs. They must outline the steps required to achieve these objectives and establish the particular functions and activities needed to carry out the goals and programs. In order to obtain the highest degree of supply effectiveness, top management must delegate authority and exact responsibility with respect to each function and activity.

A supply system which operates economically and effectively is not achieved through individual brilliance. Rather it is the result of team effort by a group of executives, each with specialized abilities, working together to achieve the objectives of the organization. The organization is planned so that objectives can be formulated, the operations performed and supervised, and the results controlled.

Lines of authority are established and specific responsibilities are exacted. Each manager knows just where he stands, what his functions are, to whom he reports and who his subordinates are. The work of each segment of the organization is coordinated with the tasks performed in other areas. This eliminates confusion, makes actions more rapid and more responsive, improves supply effectiveness and reduces the administrative burden at the top. This in turn relieves the policy makers of burdensome detail and leaves them more time for long range planning, and requirements formulation.

Operations

The heads of the operating agencies are responsible for the day to day operations of the military supply system. This means more than delegation of authority. The supply system managers must also accept responsibility for the performance of their functions. The criterion used by policy makers to evaluate performance at the operating level is supply effectiveness. Supply effectiveness means more than having the right materiel in the right place at the right time, however. It also means that supply effectiveness is achieved at a reasonable cost because every unnecessary dollar invested in inventory or spent for operations and maintenance represents a reduction of that amount in increased combat capability.

Every operating manager is responsible for following the objectives developed in policy as well as the programs and procedures of the operating agency. The operations of the supply system should be geared to the requirements of the combat forces. The responsibility for tis responsiveness belongs to the head of the operating agency. Finally, operating management is subject to the examination, questions, and appraisal of the top management of the supply system.

Control

Control is the process by which top management sees to it that goals and objectives are carried out at operating levels. In addition to assuring adherence to plans, control is necessary in order to measure progress in achieving goals and to point out mistakes so that they may be corrected and prevented from occurring again. Control is needed also to make sure that goals and objectives are changed as the situation changes.

Supervision is unquestionably the basic element of control—without good supervision, accounting and statistical data lose their meaning. This fact is recognized in the military supply system—the logistician is beginning to rate the same respect as the tactician. The recognition of the increased professional status of logistics will continue to grow as weapon systems become more complex and tacticians become increasingly dependent on a responsive supply system.

The increases in the size and complexity of the supply system in recent years makes it impossible for top management and the heads of operating agencies personally to appraise operations accurately and to assure that it is responsive to the needs of the combat forces. Therefore, a system of management controls must be developed to aid them in fulfilling these responsibilities. These controls are established to enable top management to ascertain whether:

1. Its goals, objectives, and programs are being accomplished;
2. Such goals, objectives, and programs are being obtained effectively, efficiently and economically;
3. All controls are functioning properly;
4. Assets are safeguarded and properly utilized;
5. Reports are timely, accurate and complete so that management receives correct, timely and accurate data on important facts and happenings in the organization.

Generally, management, no matter how able, cannot operate a supply system which is effective, responsive, and economical without a system of control. Broadly defined, the system of control embraces policies and programs, budgeting, accounting, and review and analysis.

The Control Mechanism

Management cannot do a satisfactory job of control and coordination without a carefully designed accounting system. All data and reports used for coordination and control must dovetail into the organization structure. This means that each successive review level is in a position to appraise performance at lower echelons in the organization. Accounting data and reports are the most useful source of control information for two reasons. First, the dollar inventory and

requirements data are the means by which resources can be reduced to a common denominator. Second, financial inventory accounting information may be collected and consolidated in terms of organization structure to show the progress of that element in accomplishing assigned responsibilities and objectives.

The control mechanism is a simplified model of the organization. It is composed of four basic elements—a standard, an actual, a comparison and the function of correction.

The Standard

A standard can be as broad as a policy of the organization or as narrow as the number of man hours required to load a box car. A standard normally represents attainable and optimum performance—if all of the numerous standards of intermediate goals throughout the supply system are met, supply responsiveness and effectiveness, as the primary goals, are attained at an economic cost.

Limitations are very closely related to standards. In private industry, budgetary standards are the product of the physical standard times the standard price. Price and quantity variances are employed to measure the deviation from the budgetary standard. In government, the budget serves not only as a standard but also as an upper limitation on the amount that can be obligated or expended. In this respect, it is much more restrictive than is a budget in commercial practice.

The Actual

Actual performance is usually measured by means of the system of records and reports. It is necessary that actual data be collected and consolidated as rapidly as possible. The value of this information for purposes of coordination and control bears a direct relationship to the period of time that has occurred since the transactions took place. Top management must have current, complete, and accurate information if it is to fulfill its responsibility of operating an effective and responsive supply system. Similarly, operating management must receive reports on a timely basis in order that the information does not lose its value.

Comparison

The comparison of actual performance with established goals and programs is the third step in the process of control. The differences between standard and actual data are referred to as variances—the greater this difference, the greater the variance between the actual and the standard.

Certain authority is delegated to each organization level of the supply system. Within the limits of this authority, the management at that level makes the necessary decisions to carry out its mission. A certain amount of flexibility, or local autonomy, is required to meet problems as they arise. This is the reason why variances have no meaning unless a range is established indicating the permissible limits within which local decisions are final decisions.

The range within which local management retains authority constitutes the tolerance limits around the standard. It is evident that the narrower the tolerance limits, the less the delegated authority—the wider they are, the greater the delegation and the broader the autonomy. The extent to which the operations of the supply system can be decentralized ultimately depends on the speed and soundness of the decisions made by local management.

Correction

The ultimate end of coordination and control is the correction of weaknesses so that the supply system will be more responsive and effective in the future. It is clear that top management cannot pass on the validity and soundness of every decision. Rather it must concentrate its time and attention on those problems which are most likely to prevent the organization from attaining its goals.

The process of placing emphases on those matters which fall outside the tolerance limits is know as management by exception. Top management can and must act on the exceptions—correction of lesser problems must be the responsibility of lower echelons.

An organization as large and complex as a military supply system cannot operate responsively and effectively unless weaknesses are corrected as they appear. The accounting reports prepared for the use of supply managers at various echelons must not only be timely—they must also indicate the exceptions which require correction. The reason for this is that top management can often initiate changes in policies, plans, and programs which are not within the competence or authority of lower echelons. The reporting system from lower to higher levels of the organization should be based on this premise. A narrative commentary should accompany every report and financial statement so that accomplishment can be compared against goals and exceptions brought to the attention of competent authorities.

Conclusion

In this presentation, the discussion has centered around the broad economic and management factors which impinge on materiel management. Materiel management, of course, is only one function performed within the military establishment. The reasoning applicable to the area of logistics is equally relevant to all aspects of military management.

WORK MEASUREMENT IN A PAPERWORK OPERATION

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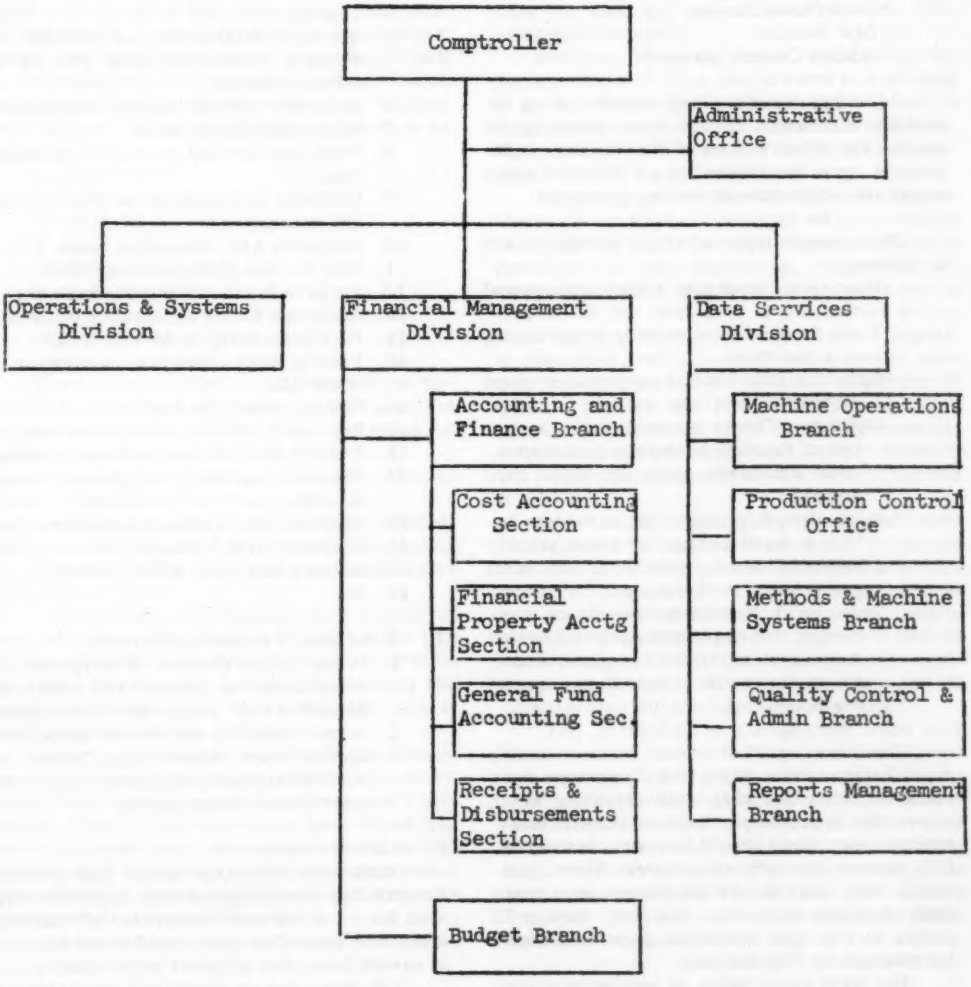
The first thing that the average person thinks of whenever work measurement is mentioned is the man with a stop watch timing production in a plant where there is an assembly line type operation. This type of work measurement is used for making estimates of cost on finished products, setting piece work rates and in making methods improvements.

The work measurement (WM) that is to be discussed in this article is that which is applicable to a paper work operation. The first comment here is usually "It can't be done." But it is being done and production standards which have been in effect for over a year are being refined at the present time.

To show how it is being done, the WM program in a Comptroller organization will be explained. In this explanation, a typical organization structure, manning, production standard, production count, etc., will be depicted.

First of all, let's see the organizations we're going to put under WM in our Comptoller organization. The organization structure of our model is shown below:



Work centers are established in the entire operation. Standards, however, are established only in the following areas:

Financial Property Accounting Section
- General Ledger Processing and Control Unit
- International Accounting Unit
- Monetary Document Control and Audit Unit
- General and Fund Accounting Section
  - Central Procurement Funds Unit
  - General Accounting and Control Unit
  - Payroll Unit
  - Travel and Transportation Unit
  - Material Services Unit
- Cost Accounting Section

Machine Operations Branch
- EAM Processing Section
- Card Punch Section
- EDP Section
- Quality Control Sections

All other functions are reported using derivative standards. In this type reporting, the production effecitveness of the function is dependent upon the production of the units under standards other than derivative standards.

The various types of other standards are as follows:

- Historical Standards: based on historical data
- Time Study: based on stop watch timing of actual work
- Standard Data: based on predetermined elemental time data
- Methods - Time - Measurement: a system of detailed predetermined motion-time standards used by MTM card holders
- Work Sampling: based on a random selected small portion or a statistically selected small portion of the total group in the work center
- Engineered Estimates: based on time factors that have been analyzed so that they might represent a realistic actual. (Used for work reported as special projects).

The manning of the work centers in this organization varies from five (5) persons to as many as thirty two (32). For reporting which shows the best comparisons of work centers' efficiencies, there should be approximately ten (10) persons in each work center. The organization that has the 32 employees is a three shift machine operations function. Having 32 people in this type operation does not hamper the analysis by WM analysts.

The first steps taken in setting up a work measurement program (WMP) is the indoctrination of management. At this time, the WM people brief the managers on the high points, features, and benefits of the WMP. The second step is to indoctrinate the working supervisors and the people. At this time the details of their part of the WMP are reviewed covering every part that they are to be concerned with.

After the indoctrinations, the WM people enter the various organizations and establish standards. These standards will be established for all jobs in the areas previously mentioned. Examples of work units for which standards are established are as follows:

A. In the accounting and finance area:
1. A.R., process stock list EAM cards
2. Balance EAM Subledger with (IAM)
3. Process SF 1080 and enter on sales register
4. Set up SF 1080 as account payable
5. Process Communications Bill for unofficial charges
6. Enter SF 1080 on register, total and post
7. Research voucher files
8. Post Commercial Accounts to voucher register
9. Maintain commercial accounts cross-reference sheet
10. Research ANG reimbursements
11. Post to cash disbursements sheet
12. Prepare forms for months business
13. Assemble forms for another business
14. Post debit entry to AF Form 823
15. Posting cash collection vouchers to AF Form 823
16. Compose and type letters
17. Reproduce copies on autostat machine
18. Posting to close out distribution ledger
19. Prepare summary of general ledger accounts
20. Prepare miscellaneous journal vouchers
21. Prepare Trial Balance
22. Balance and close sales register
23. Etc.

B. In the Data Processing Division
1. In the Quality Control Office (production count based on number and type of job release cards prepared and completed)
2. In the machine operations area (production count based on card volume and machine type recorded on an employee/machine utilization card).

C. All other areas

Derivative standards used. The over-all Comptroller percentage of total labor effectiveness for all of the work centers in "A" and "B" above are applied to total actual hours to arrive at earned hours for all other work centers.

The next step is where the standards are applied. In this step, all work accomplished is

recorded on a production tally sheet in the Financial Management Division and on the job release cards and the employee/machine utilization card in the Data Processing Division. Production count cards are prepared from the tally sheets and job release cards. (This is a mark sense operation. For the employee/machine utilization card, a key punching operation is required). These are processed against the production standard cards that have all standards for all work units. The output from this is a daily production summary listing showing input, output, backlog, production standard and earned hours based on units accomplished multiplied by production standard. For deviations from normal mission, exception cards are prepared and processed into the system.

So far we have been talking about direct labor or that labor that is spent in actual production which can be directly associated with a product or service. There is other work which is accomplished that is called indirect labor. Examples of this indirect labor best explain what indirect labor is. These examples are as follows:

1. Supervision
2. Staff mission
3. Stand by
4. Training
5. Clerical
6. Housekeeping
7. Sick Leave
8. Annual Leave

When indirect labor is reported it is reported by applying a predetermined factor to the direct earned hours. This factor is based on various ratios such as follows:

Supervision - The ratio of supervisor to direct employees supervised.

Staff mission, stand by, training, clerical, and housekeeping - the ratio of the average time in each area to the total hours including direct and indirect hours.

Also included in indirect labor is miscellaneous labor. This includes time taken for fire drills, alerts for civil defense, etc., orientation sessions, meeting with employees, security and safety meetings, etc. The factor for this is based on occurrences in the past.

Annual leave and sick leave are not included in the performance computations. However, leave factors vary each month or each pay period. This is because studies have shown that there is more sick leave taken in the winter months than in summer and there is more annual leave taken in summer months and at Christmas than at other times of the year.

These listings are used at this point in the adjustment of workload and manning to accomplish the assigned mission. At the end of each two weeks (each pay period) a bi-weekly production summary listing is prepared. Production Performance Reports are prepared from the summary listings. The performance report shows actual and earned hours and production efficiency for direct labor, indirect labor and total labor. This report includes a chart showing direct and total labor effectiveness.

From the data on the production performance report, a trend line is established to cover up to a year's time. This trend line is derived by obtaining the percentage of the total labor performance for the first half of the period covered and the percentage of the total labor performance for the second half of the period and plot these points on the chart showing the lines for each pay period for direct and total labor effectiveness.

Analysis of these charts and listings by management will show where there is a backlog of work, where adjustments have to be made in manning to stabilize production effectiveness. Also, areas where there is an excess of manpower or shortage of manpower.

In setting up a work measurement program there should be a coordinated effort to assure that products can be used to furnish data to such functions as cost accounting, manpower and management. The cost accounting report that is related to the WM data is the Report of Accounting and Finance Activities. This report, in the USAF, reflects the effectiveness by subject matter areas. For proper alignment of data to provide the best data for maximum usage, such as shown in the preceding example, work measurement work centers must be broken out in the same subject matter areas as referred to above.

It is easy to see that the nature and extent of any work measurement system is dependent upon the size, mission and functional activities involved. Regardless of what type system is set up the WMP must be carefully developed to assure that only the proper degree of control and amount of data is acquired to insure optimum manpower utilization and management effectiveness for the function concerned.

The personnel in management must have facts that are current and accurate if decisions are not to be left to guess work or opinions. An efficient Work Measurement Program will provide the commander, his staff and supervisory personnel with the required facts for determining the effectiveness and efficiency of the labor operations under their direction. Also data is available for use in the development of future plans and programs.

PROGRAM REVIEW AND ANALYSIS AT ALL LEVELS
WHY? WHAT? HOW? WHO? WHEN? WHERE?

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W H Y
Program Review and Analysis

Essence

Every boss must have a way of knowing how his work is going in order to control it. This is true in the Ordnance Command Management System, as in any other business. It is true whether the boss is the first line supervisor or the Chief of Ordnance.

Program review and analysis is essentially an organized way of providing and presenting information needed at each level for control by the person in charge at that level. In fancier language, it is the appraisal and evaluation of the effectiveness of program planning and execution. It is designed to answer these questions:

Are we doing what we planned?
Are we doing it as well as we should?
Is the planning sound?

Objective

The general objective of program review and analysis under the OCMS is to provide and present timely information in a manner which will:

Promote improved planning and execution of the installation program.

Facilitate effective managerial control of installation activities.

Assure economy and efficiency in program performance.

Achieve balance among programs and balance of resources within programs.

W H A T
Is Program Review and Analysis?

Fundamentals

We can get a clearer picture of what review and analysis is if we first look at the simple fundamental steps:

Review and analyze at all levels.

Measure accomplishments against established objectives.

Determine the "why" of variations.

Take action at each level to solve problems.

Inform higher levels of matters requiring their attention.

Of course it is not that simple. As with most other jobs, program review and analysis uses materials. It also requires tools to work these materials. Finally, it takes skills, or techniques, to use the tools. Let's first make an inventory of materials.

Materials

Objectives and Policies; Plans and Programs. As we have just said, program review and analysis measures accomplishments against objectives. But this measurement is usually indirect. Objectives are the end results desired. Policies are the general rules to be followed in attaining objectives. Plans are the means to be used to carry out policies. Programs are for a limited period of time, generally one year, and cover the portions of plans to be executed that year.

Thus, at the installation level, accomplishments are more often measured against programs, which are based on plans, which, in turn, result from policies and objectives. Certain local objectives may also be compared directly. At top levels of government, objectives are usually the main concern.

Schedules and Forecasts. Actually, schedules are the time phasing of programs or, more often, segments of programs, such as projects or subprojects. Schedules are specific declarations of intent to perform. They should not be confused with forecasts, which are, at best, educated guesses as to what may occur in the future.

Forecasts are sometimes necessary as a basis for budgeting funds and manpower when firm schedules are not possible. Actual must be compared with forecast to reassess resource requirements but not to judge performance.

A schedule which has been changed after the beginning of the reporting period is equally useless as a basis for measuring accomplishment. It would be a simple matter to change the schedule to agree with the actual to make a good showing.

Reports, Records, Studies, Manuals, etc. Other materials used in program review and analysis include reports, records, accounts, special studies, letters, memoranda, teletypes, telephone calls, inspections and personal visits. Still others are performance analyses, laws, regulations, mission statements, manuals, budgets, EAM or ADPS listings, audits, and general personal knowledge of programs and operations.

Chief among specific sources at APG are the Administrative Manual, the Activity and Installation Operating Schedules and Reports, and the EAM runs. In the mission activities, preliminary, interim and final reports of technical projects are highly useful. Other reports to higher authority are often used for local review and analysis.

Specific materials to be used in any one review and analysis report depend on the type

of project analyzed and the current status of the project. Often, only one or two sources are involved.

Tools

It is necessary to have the tools of the trade in order to use materials efficiently. Some of the main tools for Program Review and Analysis are standards, tolerances or control limits, tables, charts and narrative.

Standards. To judge the excellence of anything, actual must be compared with standard. The judge of a dog show compares the actual dog with a set of standards for the breed.

For some army projects, the only standard of performance necessary is the schedule. If it shows both units and dollars, and the actual of both are in line with the schedule, the unit cost and unit man-hours must also be in line. Local inspection and testing are required for responsible supervisors at various echelons to know whether each unit is up to the standard of quality.

At other times, a schedule is not the best basis for review and analysis. In most such cases, specific standards of performance may be used instead. These may consist of standard unit cost, standard man-hours, standard material usage, standard machine time, or standard time lag between receipt and completion of a job.

Standards of performance may be engineered (developed by an engineer), statistical (computed by statistical methods), or judgment (based on a knowledge of the operation or on past experience). If there are no other standards, the comparison may be merely with last year's record.

There are cases, too, where both schedules and standards are difficult to apply. One case is a job shop type of operation where job and time requirements vary widely and the manager has no control over the volume or timing of the workload. Another case is basic research. No one can tell how long it will take to make an original discovery.

Even in basic research or the job shop, a large area of control can be exercised in two ways. First, standards can be set for many related repetitive operations, such as clerical, mechanical, or testing processes. Second, a supervisor can usually make a valid judgment as to whether progress is encouraging or disappointing. Such qualitative results are extremely important to top management and should be reported regularly. This is especially true if an important brak-through is made or a dead end is reached. Here the standard is merely whatever rate of progress the supervisor subjectively, perhaps subconsciously, feels is "satisfactory."

Tolerances or Control Limits. In any case it can hardly be expected that the actual will conform exactly to the schedule or standard at all times. Tolerances or control limits are limits of variance beyond which corrective action is needed in case of deficiencies or special mention is required in case of outstanding accomplishments. As with standards, tolerances or control limits may be engineered, statistical, or judgment.*

A separate control limit should be set for each standard or schedule. The poorest kind of control limit is an arbitrary flat percentage across the board, such as the all too common 15 or 20 per cent. In some cases a 20 per cent variance may be perfectly normal; in others, 5 per cent may be very significant. A control limit may be set below a schedule or standard and not above when being above would require no action or special attention.

Tables, Charts, Narrative. Many records and reports, such as OCMS, are designed to facilitate review and analysis. In such cases actual often can be compared with schedules or standards without further tabulation, and only significant variances need to be extracted for further study. In other cases analytical tables must be set up so that useful comparisons can be made easily. Graphs and charts provide another common tool for plotting actual data against schedules, standards, etc. A narrative is usually necessary to point out significant variances and answer questions which they raise.

Here we speak of tables, charts and narrative as tools of analysis. The same ones may sometimes be used for presentation of results; however, a different design may be better for this purpose.

Techniques

Control Points. The object of program review and analysis is control. To establish control, we first must select control points. A control point may be any step in management or operation at which control may be exercised. Examples are the issuance of expenditure orders or work orders, setting budgets and accumulating costs. As in these examples, records are usually kept at control points and reports are usually made. If not, records and/or reports can be established for use in review and analysis.

The Exception Principle. The "exception principle" is a common concept of modern management under which only exceptional situations are brought to the attention of the manager. An "exception" is a significant variance from normal. "Normal" is the objective, policy, plan, program, schedule, forecast, standard, ordinary, or expected. A variance is "significant" if it is approaching or beyond the tolerance or control limit. If no formal control limit has been set, an informal one may be assumed.

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*A commonly used statistical control limit is two standard deviations above and/or below the mean, schedule or standard.

The principal types of exceptions are deficiencies, problem areas, new developments, outstanding achievements, and certain "hot" activities of special interest which should be reported on whether or not they are on schedule.

The exception principle applies mainly to review and analysis reports. It does not apply so well to other reports, such as financial, statistical, operational and production reports. These reports usually must include all items in order that the exceptional cases can be picked out for analysis.

Progressive Summarization. A variance which is significant at one level may be insignificant at a higher level. The Commander would not want to know about the inadequate training of one employee in an assembly line, although this may be a major headache to the first line supervisor. The Commander would want to know, however, if the employee training program was inadequate to meet the needs of the installation or if the program were seriously behind schedule.

For a variance to be significant at any one level of management, therefore, it not only must be approaching or beyond control limits, but the operation itself must be currently important enough to merit the attention of that level of management. The principle by which less and less detail is included in review and analysis reports at successively higher levels is called "Progressive Summarization." This principle applies also to other reports, such as financial, statistical, operational, etc.

Progressive summarization should be used with caution, however. In research and development type operations, so common at Aberdeen Proving Ground, a fine line of judgment may often be required to determine exactly what level of problem areas should be passed up the line. It may be necessary to simply pose the question, "would the chief want to know about this?" or, "Is this important enough to call to his attention?"

Review. Persons doing review and analysis should have a broad and thorough general knowledge of the operation being reviewed, but not necessarily a technical knowledge. Control points can then be intelligently selected and appropriate data can be assembled to exercise control at these points.

In preparation for review, statistical data are tabulated, summarized, and processed; narrative and qualitative information is extracted and condensed; analytical charts may be constructed. Then the data are examined carefully for significant variances as to:

Progress toward objectives.

Action compared with policy.

Actual compared with schedule, program or plan.

Performance compared with standard.

Adequacy of resources.

Efficiency and economy in utilization of resources.

Balance among related activities, operations, and programs.

Deficiencies or problem areas.

Outstanding accomplishments.

Results of the work programs.

Analysis. The review answers the question, "What is the exceptional situation?" The analysis must answer the questions how, when, where, why and who, as well as such questions as how much, and how many. It should also bring out the "why behind the why."

For example: "We are behind in testing because the work was not received from the customer, because the customer did not get the test material produced, because the specifications were changed." You might want to dig even deeper and add, "because plant inspections showed weaknesses, because marginal materials had been specified, because they were cheaper and more plentiful," etc. The point is to try to get to the bottom of the situation.

The "why's" may be answered first, or they may follow questions such as these: How did it come about? How do we stand with respect to this month's schedule, and to the cumulative schedule for the program to date? When did the variance first appear? How soon can it be overcome? How many units are involved? How much in dollar value? What will be the effects on other programs or projects? What are the alternative actions that can be taken? What are the probable effects of each?

The questions must be asked of the program itself, as well as of the performance. Was the planning sound? Has the situation changed enough to require program changes? Did we have the needed funds and manpower? Have the criteria or the emphasis shifted?

When all of these questions are answered and documented, we are in position to prepare the review and analysis presentation.

H O W
To Present Results of Analysis

Effective Presentation

No matter how good a job has been done on the review and analysis, it is worthless unless it is effectively presented. The presentation is "effective" if it has the desired effect, which is to get needed action or attention. The analyst must therefore point up the exceptional situations in such a way as to get them over to those in position to take action or to accord recognition.

To prepare an effective presentation, the analyst must use all types of presentation available, including narrative, tabular, and graphic, in the most effective ways.

Sparkling Narrative

The narrative is the number one method. If used to forcefully portray the whole situation, it saves the manager from having to delve into the tables and charts and try to dig out the meaning for himself.

The review and analysis report should emphasize the exceptions. Functional areas with no significant variances from normal may be lumped together at the end, where simple negative statements should make it clear that it is not worth while to dig any deeper.

Most of us have taken courses in how to write, and they are all good. There is not room in this manual to give a course in writing. But what can be done is to take up where the writing courses leave off. The specific problem here is how to write effective narrative for a review and analysis report.

Effective narrative must sparkle and even scintillate. It should "snap, crackle and pop." It might even "rock and roll." How do you write such a narrative? Well, it is true that writing is an art. But like other arts, it is made up mostly of practice in using certain rules. There is no substitute for practice. Here are some rules:

Tell only what is worth telling.

Use short sentences and paragraphs.

Choose simple words and sentence construction.

Leave out all unnecessary words, but make the meaning clear.

Write as you would talk, whether for a written or oral report.

Start with the most important subject.

Follow with other subjects in order of importance.

Start each subject with the most important result or conclusion.

Begin with a concise but forceful statement to raise questions.

Answer the questions in the order of their interest.

Make each sentence strong:

Tell something worth telling.

Express one definite idea.

Prefer active verbs.

Use expressive modifiers.

Summarize: Repeat each main point in a brief strong statement.

Tables That Talk

Use tables in the report only when they help the narrative tell the story. If you use a table, make it talk. Include in the table only the data necessary to develop the story and supply important supporting information. Place important figures in prominent positions, such as the first line or column or the last line or column. Table 1 on the opposite page is a good example of a talking table.

Picture Stories

The use of illustrations or "graphic presentation" is a very effective way to point up exceptions and shorten the narrative. But graphic presentation, as with tabular, should be used only when it does help the narrative tell the story.

Photographs, drawings, cartoons, graphs, pictographs and charts may all be used to good effect. Charts are the most common type of graphic presentation used in Review and Analysis. There are curve, surface, bar, and column charts and many variations of each type, such as pie charts and Gantt charts.* Figure 1 on the opposite page is one example of a chart that tells a picture story.

The type of chart to be used depends upon the subject to be treated, the kind of report it is to be used in, and the viewing audience. Whatever type is used, the main rule in charting is "keep it simple." Design the chart to bring out clearly the idea you wish to portray. Do not try to put too much on a single chart.

Talk Man To Man

The best way to get your story over is to talk man to man. This means that oral presentations are generally more effective than written reports. An oral presentation should be prepared in written form, but in words that will sound natural when it is read with expression. The Chief can ask questions as you go along and thus get a more complete picture of the situation. In many cases, he can also tell you right then what to do about the exception. Project the tables and illustrations onto a large screen so they can be seen clearly. Letters and numbers should be big enough to read easily from any part of the room.

Make One Report

Now you have tabular, graphic and narrative presentation. How do you put them all together to make one report? Here is how in very simple terms.

Number the tables and the illustrations and refer to them by number in the narrative whenever you wish the reader to look at them. Arrange the written report so that the tables and illustrations can be seen at the same time as the narrative if possible. At least put them as close to the narrative as possible. The following page is an example of how narrative, table and chart can fit together in a report.

In an oral presentation, project the table or illustration onto the screen at the time you refer to it. Use a pointer to indicate the exact point of attention.

WHO
Is Responsible for Program Review and Analysis

Responsibilities

Responsibilities of the various organizations for review and analysis are stated clearly in the regulations. Briefly, each organization chief is responsible for the review and analysis

*See Statistical Analysis Material, Finance School, U.S. Army, Fort Benjamin Harrison, Indiana, for more about charts and tables.

MANPOWER-WORKLOAD SITUATION (Sample Page)
(Data Hypothetical)

MANPOWER DEFICIT TREND

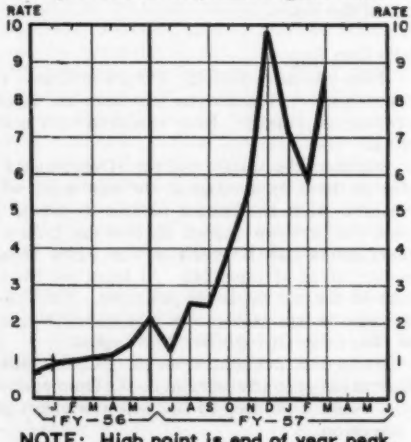
At 31 March 1957, available manpower was not sufficient to fulfill workload requirements for the fourth quarter in any of the three major activities (Table 1). Total actual strength fell 467 short of requirements, with the greatest deficit at Activity C. The manpower shortage will be even greater if the activities are required to reduce to authorized levels, since they are now over strength by 123. OCO plans another sharp cut in authorization in June, which will nearly double the present manpower deficit.

Table 1. Estimated Civilian Personnel Strength Requirements, Actual and Authorized Strengths, and Deficits For Selected Dates, FY 1957

	As of 31 March					As of 30 June	
	Estimated Requirements[a]	Actual		Authorized		Auth[b]	Probable
		Strength	Deficit	Strength	Deficit	Strength	Deficit
Activity A	4,645	4,481	164	4,436	209	4,324	321
Activity B	2,620	2,517	103	2,427	144	2,413	207
Activity C	2,924	2,724	200	2,687	237	2,619	305
TOTAL	10,189	9,722	467	9,599	590	9,356	833

NOTE: Overstrengths reflected in difference between actual and authorized.
[a] Based on RCS ORDIX-131 for March 1957.
[b] Based on current OCO guidance.
SOURCE: Manpower Office

Figure 1. OVERTIME RATES
(Hr per 100 Hr available regular time)



NOTE: High point is end of year peak.
SOURCE: Data from RCS CSGPA-392

OVERTIME TREND

The use of overtime has been increasing rapidly since the beginning of the year (Fig. 1). The March estimate shows a rising workload for the next six to twelve months. If the downward trend in strength persists in the face of the upward trend in workload, the present high rate of overtime may be expected to go even higher. Already the third quarter overtime is equivalent in man months to 340 full time employees.

of his own activity. This is true at each level; that is, activity, division, branch, section. The Comptroller, through his Review and Analysis staff, is responsible for the over-all review and analysis of the entire installation program and for staff and technical supervision over all review and analysis throughout the installation.

Staffing

Program review and analysis is too much of an exacting and time consuming job to be done entirely by the head of a large organization. He cannot afford to spend his time poring over voluminous detailed reports trying to dig out their meaning in terms of program management. Just as he delegates much of the planning and execution phases of his program, so must he delegate the review and analysis phase. If it is recognized that review and analysis is one of these three important phases of any program, then it must be recognized that staffing is required.

In the larger organizations where the budget runs into the millions of dollars, it will surely pay dividends for at least one staff member to spend his full time, with clerical assistance, to keep tab on the progress and status of the program. Within these large organizations, each suborganization may wish to designate some person at least part time to coordinate and perform its own internal program review and analysis.

The smaller organizations should also each have some one person charged with this responsibility. Here, also, it must be recognized that program review and analysis is work which takes time, and time should be provided along with appropriate clerical assistance.

All members of the Review and Analysis staff of the Comptroller Office are available to other organizations at all times for technical and staff assistance.

The Analyst

Anyone from the GS-2 clerk to the commander may do analysis. A person whose primary function is program review and analysis may be referred to as an "analyst." The analyst should be carefully selected and trained. With respect to training, the course in "Techniques of Review and Analysis" at the Army Finance School, Fort Benjamin Harrison, is recommended. With respect to selection, it must be recognized that not everyone is adapted to this type of work. This is apparent from the qualifications of a good analyst as quoted from an Army Publication:*

> "An analyst should have a knowledge of the fundamentals of such fields as statistics, economics, accounting, budgeting and business administration. He should be acquainted with the principles, methods and operations in such areas as tabular and graphic presentation, financial analysis, cost analysis, budget analysis, work measurement and organization. Of equal importance are such personal qualifications as tact, good judgment, self-expression, patience, and a general ability to get along with people. He must have an inquisitive and inquiring mind and an ability to analyze, interpret and evaluate information. The knowledge of particular subject fields is valuable but not essential. Above all, an analyst must be capable of applying his thinking ability to the review and analysis process. These are the optimum qualifications. It is obvious that careful compromises must be made in the selection of review and analysis personnel."

*FSUSA-C 339.10, "A Practical Guide to Review and Analysis." Army Finance School, Fort Benjamin Harrison, Indiana.

WHEN AND WHERE
Of Program Review and Analysis

When

Probably every organization does some review and analysis every day. That's because decisions are made every day, and some analysis of available information is necessary as a basis for these decisions. The process is essentially a continuous one, with no beginning and no ending. The one most important quality of review and analysis is timeliness. The analysis must be available in time to be the basis for decisions.

In most organizations, however, much of the information becomes available in periodic reports or summarizing of records. This tends to make review and analysis periodic also. Often, weekly and even daily reports are necessary to maintain effective control. These must be reviewed and analyzed currently if they are to achieve their purposes. Such frequent periods are more common in wartime or in crash programs.

Since most reports and summary records are prepared monthly or quarterly, these are the most common periods for review and analysis reports. This is especially true of oral presentations and published progress reports. Semi-annual and annual reports are also useful for analysis.

Review and analysis can also be done on a cyclic basis. This is effective when staff is limited and strict control is not required. Under this principle, a different activity is reviewed each week, month, or quarter. By this means, any one activity will be reviewed every so often, such as once every month, quarter, or year.

Where

Program review and analysis must be done in all organizational elements. It must be done informally, if not formally. A unit chief and, indeed, each person in a unit, must judge the

results of the work he is responsible for. He must take corrective action where needed and report problems to his supervisor. Section and Division chiefs must do the same thing.

Commanders, staff officers, and heads of activities must have effective review and analysis of their own programs in order to exercise control. They, in turn are obliged to keep the installation commander informed and to seek his help when needed.

Thus, the answer to the "where" of review and analysis is "everywhere."

Where to Read More

Another "where" question on review and analysis is where to read about it. This article has purposely been kept brief to conserve the time of busy people. However, its contents are all authentic, although they have been drawn from many sources. Those who would like to delve more deeply into the subject of program review and analysis and the management system of the Army in general may refer to any or all of the publications listed below:

AR 1-11, The Army Management Structure
AR 10-82, Comptrollers in the Army Establishment
AR 11-1, The Army Program System
SR 11-10-6, Army Programs (Review and Analysis)
SR 11-10, Series, Army Programs
FM 101-51 (C), DA Planning and Programming Manual
DA Pamphlet No. 1-10, Improve Your Writing
DA Pamphlet No. 35-10, The Comptroller's Guide
DA Pamphlet No. 11-20, Practical Examples of Review and Analysis at Class II Installations.
Logistics Directive No. 69-11, Application of the Army Program System to the Operating Programs of DCSLOG and the Technical Services
ORDP 60-4, The Ordnance Corps Program System
ORDM 1-5, The Ordnance Management Structure
ORDM 1-6, Operating and Supporting Schedules
ORDM 9-1, The Ordnance Corps Program System
FSUSA-C 339.10, "A Practical Guide to Review and Analysis," Finance School, U.S. Army
FSUSA-C 330.3, "Statistical Analysis Material," Finance School, U.S. Army

SUMMARY
Of Program Review and Analysis

Program review and analysis is required to provide each level of operation or command with timely information in a form which will facilitate managerial control.

Useful materials for program review and analysis include objectives, policies, plans, programs, schedules, reports, and records. Standards, control limits, tables, charts and narrative are among the useful tools.

Only the exceptional situations are analyzed. These are significant variances from normal as determined from data accumulated at selected control points and progressively summarized at each higher level. The principal types of exceptions are deficiencies, problem areas, new developments, outstanding achievements, and "hot" activities.

Review finds out what the exception is. Analysis answers the questions how, how much, when, where, why, and who. Effective presentation is necessary to make the analysis useful.

Presentation, written or oral, usually requires tabular, graphic and narrative techniques. The most effective narrative is simple and concise. Tables, charts, etc. must be constructed to show simple ideas clearly.

Tables, charts and narrative must be woven together in such a way as to make a single effective review and analysis report.

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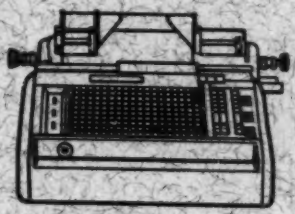

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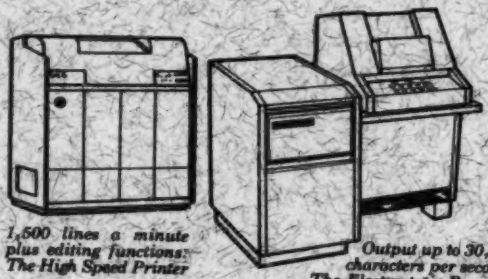

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Further information about the RCA 501 Electronic Data Processing System is available on request. Address . . . Electronic Data Processing Division, Radio Corporation of America, Camden 2, New Jersey.

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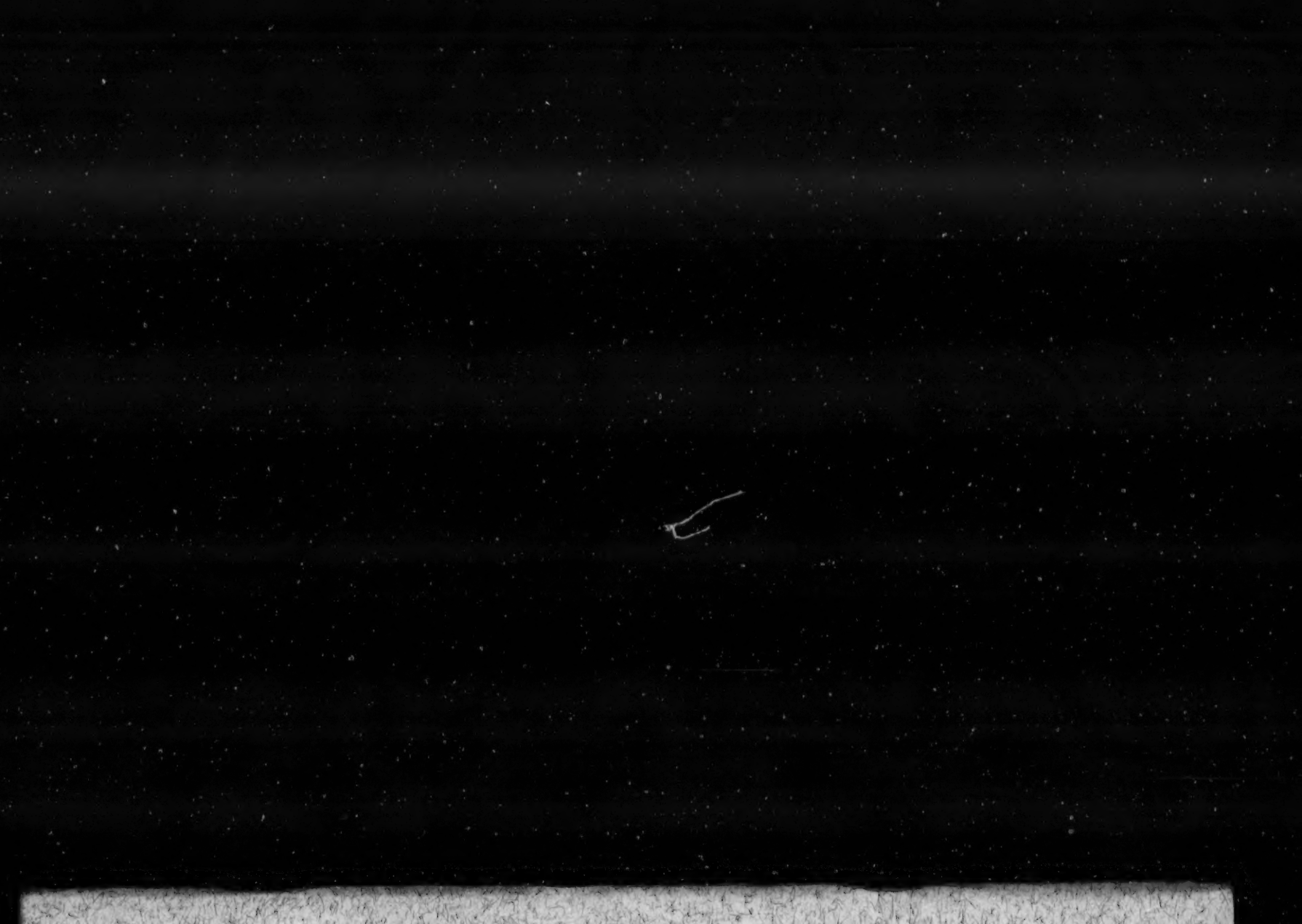
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